

UNITED STATES DEPARTMENT OF ENERGY  
OFFICE OF FOSSIL ENERGY  
CARBON SEQUESTRATION PROGRAM  
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT  
PUBLIC SCOPING MEETING  
TAKEN ON TUESDAY, MAY 18, 2004  
GREATER COLUMBUS CONVENTION CENTER  
400 NORTH HIGH STREET  
COLUMBUS, OHIO 43215

- - -

TRANSCRIPT OF PROCEEDINGS

- - -



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## INDEX TO WITNESSES

|    |                |      |
|----|----------------|------|
| 1  |                |      |
| 2  |                |      |
| 3  | - - -          |      |
| 4  |                |      |
| 5  | WITNESSES      | PAGE |
| 6  |                |      |
| 7  | SCOTT KLARA    | 7    |
| 8  | KURT WALTZER   | 28   |
| 9  | MIKE MUDD      | 29   |
| 10 | KLAUS LAMBECK  | 30   |
| 11 | JACKIE BIRD    | 33   |
| 12 | ELIZABETH SHAW | 38   |
| 13 | RATTAN LAL     | 42   |
| 14 | - - -          |      |
| 15 |                |      |
| 16 |                |      |
| 17 |                |      |
| 18 |                |      |
| 19 |                |      |
| 20 |                |      |
| 21 |                |      |
| 22 |                |      |
| 23 |                |      |
| 24 |                |      |
| 25 |                |      |

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MR. LORENZI: Let's begin the meeting.

3

This meeting was arranged by the U.S.

4

Department of Energy as part of a process to obtain

5

public participation in preparing a detailed

6

environmental review in terms of an Environmental

7

Impact Statement that will assist the Department of

8

Energy in identifying and prioritizing issues,

9

evaluating potential impacts, establishing a framework

10

for environmental solutions and defining a program for

11

future research, development and testing of

12

technologies and methods for sequestration of carbon

13

dioxide.

14

This is the second of eight meetings planned

15

at various locations around the country for that

16

purpose.

17

The carbon sequestration activities supported

18

by the Department of Energy will help achieve the goals

19

of the Global Climate Change Initiative announced by

20

the President in 2002. That initiative will require

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both development of a portfolio of technology options

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with potential for reducing the carbon intensity of the

23

U.S. economy, as well as establishment of the

24

information base needed by the year 2012 for effective

25

carbon sequestration decisions that balance economic

1 growth and investment in clean energy technologies.

2 The implementation of a carbon sequestration  
3 program to achieve those goals is the essence of the  
4 Department of Energy's action requiring preparation of  
5 an Environmental Impact Statement

6 Your input and comments, as well as input and  
7 comments that we receive from all these eight meetings,  
8 as well as through the end of the comment period on  
9 June 25th, will be an important part of our effort to  
10 prepare the Environmental Impact Statement. So,  
11 tonight, I thank you for your attendance.

12 My name is Lloyd Lorenzi and I'm an employee  
13 from the Department of Energy's laboratory in  
14 Pittsburgh, Pennsylvania. We have one other  
15 representative here tonight from the Department of  
16 Energy and he will introduce himself.

17 MR. KLARA: Thank you. I'm Scott Klara with  
18 the U.S. Department of Energy at the National Energy  
19 Technology Laboratory.

20 MR. LORENZI: Assisting the Department of  
21 Energy with preparation of the Environmental Impact  
22 Statement, as well as with the logistics of this  
23 meeting, is a team of environmental and administrative  
24 specialists led by Potomac-Hudson Engineering Company,  
25 and I would ask the representatives of the

1 Potomac-Hudson team represented here tonight to  
2 introduce themselves.

3 MR. CAREY: Good evening. My name is Fred  
4 Carey. I'm with Potomac-Hudson Engineering. I also  
5 have with me as part of our team Kevin Johnson with URS  
6 Corporation.

7 MR. LORENZI: We also have a court reporter  
8 here to prepare a transcript of this meeting,  
9 particularly of your comments, which we will use to  
10 document and identify views from the public regarding  
11 the desired scope and content of the environmental  
12 analysis that we will undertake.

13 At the entrance that was just outside the  
14 meeting room door we provided information regarding  
15 tonight's meeting, and that includes descriptions of  
16 the process that the Department of Energy will follow  
17 to prepare the DOE's Environmental Impact Statement,  
18 and also the Department of Energy's current activities  
19 and plans related to carbon sequestration studies.

20 We have also provided the registration sheet.  
21 I want to encourage you to sign the form as a record of  
22 your attendance at the meeting tonight, and we've also  
23 provided comment sheets that you can use tonight or  
24 following the meeting to submit written comments. But  
25 tonight we want to hear your oral comments on our

1 effort to prepare an environmental analysis on the  
2 carbon sequestration program, as well as on the program  
3 itself.

4 We will use those comments, as I said as well  
5 as any other comments received up to and including June  
6 25th, to assist us in preparing the Environmental  
7 Impact Statement.

8 The draft of that Environmental Impact  
9 Statement is currently planned for completion or  
10 targeted for completion by the end of next summer and  
11 it would be made available for review and comment at  
12 the draft stage next summer before it's finalized, and  
13 the final version will probably be completed maybe in  
14 mid-2006.

15 Before we begin with your comments, Scott  
16 Klara with the Department of Energy will provide a  
17 summary of carbon sequestration activities. And in the  
18 microphone or if you don't need a microphone, just yell  
19 out, you will be provided the opportunity to provide  
20 comments. Scott.

21 MR. KLARA: Welcome everyone. We certainly  
22 appreciate your attendance in the evening after a hard  
23 day's work and very valuable to this process.

24 As I said a few minutes ago, I'm Scott Klara  
25 with the U.S. Department of Energy at the National



1 Energy Technology Laboratory, and what I'm going to do  
2 today at a very high level is discuss carbon  
3 sequestration activities within the Department of  
4 Energy, specifically within the Office of Fossil Energy  
5 of the DOE.

6 Here's an outline of the talk this evening,  
7 and I'm going to, again, keep it at a very high level.

8 I'm going to discuss some of the concepts of  
9 what carbon sequestration is, talk a little bit about  
10 both the fossil energy situation and the greenhouse gas  
11 implications from that, and then go into the  
12 sequestration program overview at a very high level, go  
13 over requirements and structure of the program, and  
14 then go over several key initiatives that are emerging  
15 within the Department that will likely in years to come  
16 resolve in field activities that will benefit from the  
17 Programmatic Environmental Impact Statement that we're  
18 going forward with.

19 I'll talk about what is carbon sequestration.  
20 To many, sequestration is an odd term that's difficult  
21 to understand. Many people like to refer to it as  
22 storage.

23 Essentially, what we mean is the capture and  
24 storage of CO<sub>2</sub> and other greenhouse gases that would  
25 otherwise be emitted into the atmosphere. And the

1 importance here is you capture it both at a point  
2 source such as a large power plant, for example, or you  
3 can capture it via other methods. Typically  
4 terrestrial methods. Planting trees, for example,  
5 where you're capturing the CO2 out of the air but you  
6 really don't know where it came from. So those are the  
7 two general categories of capture that we have.

8           From a standpoint of storage, several  
9 location opportunities exist to store these greenhouse  
10 gases. Probably the front-running candidate for  
11 storage is what we call geologic storage, which is  
12 under the ground.

13           These typically deal with oil & gas  
14 reservoirs, a reservoir called saline reservoir where  
15 there's brackish saltwater and unmineable coal  
16 formations. And those are really the key geological  
17 sequestration options that are being pursued.

18           Some other options are also being considered.  
19 The dissolving of CO2 in the deep oceans or in the  
20 sediment beneath the ocean.

21           Right now no one is stating ocean  
22 sequestration is a real option. There are still many  
23 questions on the environmental side that have to be  
24 worked out. But because the ocean is the world's  
25 largest natural sink, right now we're really trying to

1 understand the mechanisms and looking at leverage and  
2 options that might increase CO2 dissolution in the  
3 ocean. And another reason for looking at the ocean as  
4 well as years from now, if the current rate of  
5 dissolution in the ocean changes, we want to have some  
6 good idea on understanding why that's occurring and  
7 what's happening to make that occur.

8 Another option is being able to convert CO2 to  
9 solid materials. You can with chemical reaction  
10 mechanisms convert CO2 to what's called carbonates, and  
11 these are rock-like minerals, mineral substances. And  
12 I have a prop that I've brought today of magnesium  
13 carbonate. This contains about 25 percent CO2 and this  
14 is locked into this solid material. This is one  
15 pathway that we're pursuing as an option to deal with  
16 CO2 sequestration.

17 And lastly, I mentioned just a few minutes  
18 ago, terrestrial sequestration where we're looking at  
19 reforestation, as well as enhanced agricultural  
20 practices that keep carbon stored in the soil and the  
21 plant life.

22 To give you a sense of what fossil energy  
23 means to the United States and the world, what I show  
24 here is two pie charts. The pie chart on the left  
25 shows the energy mix from fossil fuels and other energy

1 options for the United States and then on the right  
2 figure shows it for the world. And what you see here  
3 is that fossil energy accounts for about 86 percent of  
4 the energy needs in the United States and,  
5 coincidentally, in the world as well. So a key, key  
6 energy source.

7 What I want to show here is that was a picture  
8 from 2002. Now let's take a look at what we think is  
9 going to happen in the future.

10 What this lower left pie chart shows is the  
11 energy mix in 2002. And, again, it shows about the 86  
12 percent use of fossil fuels. You can see it's divided  
13 there with oil at about 39, coal 23 and gas 24 percent  
14 of the total mix in 2002. And what we know is that  
15 when we go to the year 2025, nearly all projections are  
16 stating that these fossil fuels will remain at least at  
17 those levels. So we end up with 86 percent in 2002, up  
18 to 87 percent roughly stable in 2025. But the key here  
19 is we're going to use a lot more of this.

20 So right now when you have fossil fuels, they  
21 contain something called carbon. When you burn these  
22 fossil fuels, you produce CO<sub>2</sub>, which is a predominant  
23 greenhouse gas.

24 In 2002, we're burning it at these levels  
25 called 98 quadrillion BTUs per year. What we see in

1 2025 is now we're going to go up to 126 quadrillion  
2 BTU's per year.

3 What does that mean in terms of greenhouse  
4 gas emissions? We're going to be emitting much more  
5 CO2 based on these forecasts.

6 Let me now try to give you a sense of, well,  
7 what does this all potentially mean to climate change  
8 and what does it mean to CO2 concentrations in the  
9 atmosphere.

10 What this graph shows is the time scale over  
11 the last several hundred-thousand years. It shows both  
12 the temperature, which is the lower black line, and the  
13 CO2 concentration, which is the upper blue line.

14 Some messages I want you to take away from  
15 this chart. One is, for the last several  
16 hundred-thousand years temperature and CO2  
17 concentrations have been tracking each other.

18 Then what you'll see is on the upper right  
19 side is you'll see this arrow that kind of goes  
20 straight up from the bottom level of 280 to a level of  
21 370. That's what's happened over the last 150 years  
22 since the start of the Industrial Revolution.

23 So, CO2 concentrations have gone up 30  
24 percent over the last 150 years. So, the concern and  
25 implications are, if CO2 concentrations and temperature

1 track so well for the last couple hundred-thousand  
2 years, what might happen in the future?

3 Another point to add from this slide is that  
4 right now we're looking at increasing the CO2  
5 concentration at about 1.5 or so ppm per year, and that  
6 rate seems to be slightly increasing year by year.  
7 Next.

8 What this pie chart shows is the United States  
9 greenhouse gas emissions and a breakout from the  
10 various emission sources, and these are anthropogenic  
11 emission sources, which means human-induced.

12 What you see from this chart is that CO2 is  
13 the prominent greenhouse gases in the United States  
14 accounting for about 81 percent of the mix. You also  
15 see another component there called methane at 9  
16 percent.

17 So those two, CO2, carbon dioxide and  
18 methane, are the key greenhouse gas in the United  
19 States, and this all translates to most developed  
20 countries in the world.

21 The point I want to make relative to the DOE  
22 program is the bulk focus of our R&D activities relate  
23 to CO2 from energy, mainly because of the implications  
24 of this pie. We do have a small part of our program  
25 that's focusing on the methane component and that

1 methane component deals with fugitive methane emissions  
2 from landfills, natural gas pipeline distribution  
3 systems, and underground coal mines, and we're  
4 developing some technologies that are able to deal with  
5 that.

6 This is another chart showing that all fossil  
7 fuels and energy sectors contribute CO2 emissions.

8 I want to point your attention to the bottom  
9 middle pie, which essentially shows that with the  
10 fossil fuel mix, 46 percent oil and then coal and  
11 national gas are close to 30 percent each. This gives  
12 a contribution..

13 The pie on the right-hand side I want to  
14 speak to as well, and it shows that when you divide it  
15 in terms of sector, you see that electricity  
16 contributes about 40 percent of the greenhouse gas  
17 emissions, transportation at 30 percent, 32 percent and  
18 then other.

19 From this slide, the research and development  
20 that we're pursuing in the program right now relate  
21 almost exclusively to coal at 30 percent and then the  
22 electricity sector at 40 percent. Because right now  
23 with coal, 90 percent of coal in the United States is  
24 used for power generation. Also, power generation  
25 represents a very nice opportunity where you have a

1 large source of CO2 that you can come in and capture  
2 and capture very large quantities.

3 So that's why coal and power generation, at  
4 least in our program and really throughout the world,  
5 are being looked at as the first options that we would  
6 pursue if we would need to capture large quantities of  
7 CO2.

8 When dealing with carbon management options  
9 it's often divided into three legs. Some people call  
10 this three legs of the stool, three corners of the  
11 pyramid. What you'll see is reduced carbon intensity.

12 These options are things like renewable  
13 energy: solar wind, nuclear, and fuel switching,  
14 switching from coal to some lower carbon-based fuel.

15 The middle section is improved efficiency  
16 and that could be both on the demand side, for example,  
17 improving the efficiency of cars and improving  
18 efficiency of refrigerators and things like that. And  
19 also on the supply side. Improving the efficiency that  
20 we produce and generate electricity in a power plant.  
21 And then the third option, which we're here to speak to  
22 in our program, is sequestering carbon. And as I  
23 mentioned earlier, that's capture and storage and also  
24 enhancing natural sinks.

25 A message to take away from here, and I'll



1 show you a little more detail later, is that all three  
2 of these options are critically necessary to deal with  
3 this issue. The issue is too large for any one option  
4 alone to handle it. And so as you'll see as we go  
5 forward in these next few slides, you truly need all of  
6 these options to deal with greenhouse gas emissions if  
7 we decide we're going to do something.

8 Next.

9 From the standpoint of the presidential  
10 direction that drives our R&D program there's really  
11 two key initiatives that have been mentioned over the  
12 last several years.

13 One is something called the National Climate  
14 Change Technology Initiative in June 11th of 2001. And  
15 the importance of this initiative was it was one of the  
16 first presidential statements under this Administration  
17 that talked about climate change as an issue, and also  
18 mentioned carbon sequestration as one of the key  
19 technology options that deal with this issue.

20 The second was the Global Climate Change  
21 Initiative on Valentine's Day of 2002. That was  
22 released the same day as something called the Clear  
23 Skies Initiative which dealt with criteria and  
24 pollutants, and hence this initiative probably didn't  
25 get as much press as it should have.

1           This was another presidential initiative that  
2   focused on greenhouse gas emissions and carbon  
3   sequestration, but more importantly, it puts some  
4   metrics on the United States. And what it did it said  
5   we want to reduce what is something called the  
6   greenhouse gas intensity by a certain amount over the  
7   next 10 years.

8           So within our program a lot of our  
9   technologies and technology mix that we're pursuing are  
10   related to dealing with this target specified by this  
11   Global Climate Change Initiative. Next.

12           One reason that sequestration gets so much  
13   hoopla is because of the large capacities that exist.

14           I'm going to show you in the next slide or  
15   two slides from now the significant quantity of  
16   emissions that we have in the United States and in the  
17   world.

18           Very few options exist that could make a big  
19   dent in these emissions but sequestration is one that  
20   can. And what this chart shows is on the right-hand  
21   side -- don't be too concerned with the numbers, the  
22   capacity side, but you'll see on the right-hand side  
23   Annual World Emissions. This number is at about 6.5  
24   gigatons. 6.5 billion tons for the world emissions.

25           And then what you will see from these charts,

1 I don't know how well you can see it with this light,  
2 but you'll see a dark bar and then the upper part of  
3 the bar is more of a shade, and what that shows is the  
4 ranges that we believe exist right now for capacity of  
5 these storage options to handle CO2.

6 And the message to take away from this slide  
7 is, we believe even with conservative estimates that  
8 there's at least a century or more worth of capacity in  
9 sequestration. A century or more's worth of capacity,  
10 if not centuries. That is one reason why sequestration  
11 gets so much hoopla in the portfolio of approaches that  
12 we're pursuing related to greenhouse gases. Next.

13 What this chart shows is we've performed some  
14 analysis, as many organizations have, on if we were to  
15 look at the United States through the middle of the  
16 century and put a scenario together that says we want  
17 to stabilize emissions at some level, and so what we've  
18 done with this analysis we said let's try to stabilize  
19 emissions at 2002 levels in the United States.

20 What happens is you get this gap of emissions  
21 that by the year 2015 is 1,700 million metric tons of  
22 carbon in the year 2015.

23 Some messages from this slide: 1,700 million  
24 metric tons. Such a large number.

25 The American Electricity Power plant, they

1 have several power plants in your region, some of the  
2 largest in the country, will emit eight. So 1,700 is  
3 the gap we would have to make up. One large power  
4 plant is eight, just to show you the magnitude of those  
5 emissions.

6 And another message that this slide should  
7 show is -- this is our analysis. Many other analysis  
8 would show the same thing. -- is because of how large  
9 these emissions are, sequestration is going to have to  
10 bear the brunt of the emissions reduction at least 60  
11 percent or more. And in this analysis, which  
12 sequestration is those top two options, followed by  
13 non-CO2 greenhouse gases, which are these fugitive  
14 methane emissions, followed by afforestation,  
15 agriculture and the bottom sentence is efficiency and  
16 renewables.

17 So, again, the message here is the emissions  
18 are so large that the options we have available to deal  
19 with them, sequestration is a very key option that has  
20 the capacity to meet these kind of reductions. Next.

21 What are our requirements for sequestration?  
22 Probably these are very obvious but certainly it has to  
23 be environmentally acceptable.

24 It can offer no legacy for future  
25 generations. It has to respect the ecosystems and, if

1 possible, improve ecosystems, for example, by planting  
2 trees.

3 It has to be safe. No hidden, sudden large  
4 discharges. And even seepage we're concerned about.

5 And so we're developing portfolios of  
6 technologies that are allowing us to be able to track  
7 the fate of the CO2 and if it does leak to be able to  
8 mitigate that leakage.

9 It's verifiable. Very important that we have  
10 the ability to verify the amount of CO2 sequestered.

11 If we're putting all of these millions to  
12 billions of tons of CO2 in the ground, for example, for  
13 geologic sequestration, we better be able to make sure  
14 what we're putting down there and account for it and  
15 make sure that it stays there. And the last one is  
16 economically viable.

17 There's research being pursued throughout the  
18 government and also throughout the Department of  
19 Energy, and what this slide is intended to show is  
20 within the Department we have something called the  
21 Climate Change Technology Program, which is this upper  
22 box, and it performs this coordinating function  
23 throughout the Department related to climate change  
24 activities and R&D.

25 Then there's an Office of Science Component,

1    which is, I guess, on your lower right box. That's  
2    where more of the fundamental, basic research occurs  
3    within the Department. The research that really  
4    doesn't have a use yet and we don't know that it will  
5    have a use. And that's where a lot of that Office of  
6    Science work is just looking at the fundamental basics  
7    of what's going on.

8               Where this program resides is in this lower  
9    left box called the Office of Fossil Energy and Applied  
10   R&D. And the reason that we're coming forward and  
11   wanting to go through a Programmatic Environmental  
12   Impact Statement is that we're really the group that's  
13   looking at the R&D that's headed toward near term and  
14   future deployment.

15              So we're really the ones that are developing  
16   the technology that's going to be getting out there,  
17   and if there are environmental implications, having to  
18   manage those and deal with those. Next.

19              Here's another slide that shows a bunch of  
20   agency activities throughout the government.  
21   Everything from NASA to the geologic survey NOAA and,  
22   et cetera.

23              I just want to show two examples of this, that  
24   we try very hard to coordinate these activities  
25   throughout the government. It's a very challenging

1 task. But some examples. For example, EPA,  
2 Environmental Protection Agency, is a lead agency for  
3 these non-CO2 greenhouse gases, these fugitive methane  
4 gases. The program that we have helps to support and  
5 work with the EPA on some of that activity.

6 The lower box here is the United States  
7 Department of Agriculture. They look at terrestrial  
8 sequestration. No-till farming, activities that leave  
9 more carbon in the ground. We also work hand-in-hand  
10 with many of those activities.

11 So this is just kind of a snapshot of all the  
12 different government activities that exist just to let  
13 you know it's being looked at from a very broad  
14 perspective. Next slide.

15 This slide it's about the depth of our  
16 program. This larger bubble on the left shows the core  
17 R&D program. It's divided into these three large  
18 categories: capture, sequestration, break-through  
19 concepts, non-CO2 greenhouse gases, which are these  
20 fugitive methane emissions, and measurement, monitoring  
21 and verification. That's a term we use that develops  
22 technologies, tracks the fate and permanence of the CO2  
23 of the greenhouse gases. Then we have two larger  
24 initiatives that I'm going to speak to in the remaining  
25 slides.

1           One is called the Regional Partners dealing  
2   with infrastructure, I'll address that in more detail  
3   soon, and another is called FutureGen, which is our  
4   large-scale field test activity.

5           About a year -- well, probably about eight  
6   months ago now we established what we call Regional  
7   Carbon Sequestration Partnerships throughout the United  
8   States. We established seven of these partners.

9           You have a partnership in this area called  
10   the Midwest Partnership. Some of the partners are here  
11   this evening. And what this slide shows is that we  
12   encompass right now 154 organizations, two Canadian  
13   provinces, three Indian nations and right now 40  
14   states. We have a gap in the northeast area of the  
15   country. Not really a surprise in the northeast area  
16   of the country. There's not real large geologic sinks  
17   available for sequestration and so much less interest  
18   in the sequestration concept in that region of the  
19   country. Next.

20           What are these partnerships about?  
21   Essentially, helping to develop what I call the  
22   infrastructure for wide-scale deployment.

23           The fact is that if we had technologies today  
24   that were cost-effective and environmentally benign, we  
25   couldn't deploy them tomorrow.



1           Some of the reasons we couldn't deploy them  
2 tomorrow is base-lining regions for sources and sinks.

3           We have nice, broad maps of the country that  
4 show where these geologic formations are, but the  
5 reality is most of those formations are unproven.  
6 Some parts of those formations won't be suitable sinks,  
7 and we don't have a good grasp yet of the proven versus  
8 unproven regions.

9           Addressing the regulatory environmental  
10 outreach issues. Right now if you say you want to put  
11 a sequestration project into play, nobody even has a  
12 clue yet what regulations would apply to that.

13           Establish monitoring and verification  
14 protocols. Within this program we can develop a lot of  
15 the instrumentation and tools that allow you to take a  
16 snapshot of a geologic formation and look at the CO2.

17           What this program can't do is deal with more  
18 of the subjective decisions. For example, how often do  
19 you take a picture of the reservoir? Are you required  
20 to take it once a day, once a week, once a month?

21           If you plant a tree, do you have a forester  
22 go out and test it once a month, once every six months?

23           That's some of the issues where we mean  
24 they're establishing those protocols.

25           Validating some of these technologies and

1 infrastructure. Once we have methods for some of the  
2 above issues, let's go out and test them, see if they  
3 work, find out how we need to tweak them.

4 And the last thing is determining benefits of  
5 sequestration to a region. You might think, well, what  
6 are some of the benefits to a region. Well, it turns  
7 out that you can put CO2 in the ground to enhance oil  
8 recovery, you can put CO2 in the ground to enhance  
9 methane recovery.

10 In some states they even have unique  
11 situations, New Mexico, for example, where they're so  
12 desperate for water and in some regions they're looking  
13 to produce this brackish water from these saline  
14 formations and clean it up for drinking water. Well,  
15 what that does is it adds huge capacities to that  
16 reservoir for CO2, and CO2 could also be used for a  
17 driving fluid to produce the water.

18 So all kinds of synergistic benefits can and  
19 likely accrue if sequestration gets to large-scale  
20 deployment in various regions. Next.

21 Last, I'd like to just mention our FutureGen  
22 initiative, a very key initiative within the  
23 Department.

24 We're looking to build a billion-dollar test  
25 facility, and this test facility will use

1 state-of-the-art coal technology to produce electricity  
2 and hydrogen from coal.

3 We're looking to evaluate and test our  
4 technologies that will show that you can use coal and  
5 emit virtually no air pollution, including greenhouse  
6 gases.

7 The greenhouse gas of interest will be to  
8 capture and permanently sequester CO2. We're looking  
9 into geologic formation as the storage point for this  
10 FutureGen project.

11 I'd like to end the presentation with some  
12 information sources. I'd just like to state that I  
13 kept this at a very high level for this meeting because  
14 of the diverse audiences that are expected for this  
15 effort, but I just want to let you know that all kind  
16 of resources are available, including people and  
17 websites, that contain all kind of detailed information  
18 and helpful information if you're interested.

19 This just shows the website for the Carbon  
20 Sequestration Program, which you can find at the  
21 weblinks shown there, [www.netl.doe.gov](http://www.netl.doe.gov). Next.

22 You have this in your packets of information.  
23 We also offer a free electronic subscription to a  
24 Carbon Sequestration newsletter that comes out roughly  
25 monthly, and you can join that electronically through

1 the website or through the link mentioned in your  
2 package on this page and free of charge.

3 As long as you have an e-mail address, you'll  
4 be able to receive this on a monthly basis, which does  
5 a very good job of showing highlights that occur  
6 throughout the United States and the world relative to  
7 sequestration concepts. And with that, that ends my  
8 portion of the presentation.

9 MR. LORENZI: We have six people who have  
10 signed up to make comments tonight as of a few minutes  
11 ago.

12 MR. KLARA: And we're not confined to those  
13 six. So if others would have comments, please feel  
14 welcome.

15 MR. LORENZI: We'll take them in the order  
16 that they registered outside the door, and we will ask  
17 the commentators to at least initially try to limit the  
18 extent of their comments to about five minutes, which  
19 was about the length of my opening remarks. And if you  
20 need more time, that will be offered. But we'll go  
21 through the list of registered individuals and then if  
22 any others want to make comments, they will be offered  
23 the opportunity to do so.

24 We ask that you do state your name and spell  
25 your name for the benefit of the court reporter and

1 indicate an organizational affiliation as you're making  
2 comments on behalf of an organization.

3 The first person who registered is  
4 Kurt Waltzer.

5 - - -

6 MR. WALTZER: Thank you. I am  
7 Kurt Waltzer, K-U-R-T W-A-L-T-Z-E-R. I'm making  
8 comments on behalf of the Ohio Environmental Council.

9 The Ohio Environmental Council is a statewide  
10 network of environmental organizations in Ohio, and we  
11 are actually a partner in the Midwest Partnership.  
12 We're going to be submitting written comments, but I  
13 wanted to make three brief oral comments.

14 First, the reason we're participating in the  
15 partnership in our support of carbon sequestration  
16 research is because we believe it is not sufficient but  
17 absolutely necessary to address climate stabilization  
18 in a state like Ohio.

19 We believe the ultimate solutions are going  
20 to include renewable energy, energy efficiency, and all  
21 types of carbon sequestration. So we're very  
22 supportive of moving forward on this research.

23 My second point is we appreciate the  
24 opportunity to comment on the development of an  
25 Environmental Impact Statement. Because we're in an

1 environmental organization, we care about the  
2 environmental issues relating to carbon sequestration  
3 at all levels. So we want to be diligent to ensure  
4 that every aspect of our environment and public health  
5 are protected as we're moving forward on this  
6 technology.

7 And, third, I want to encourage the  
8 continuation even beyond the end of the comment period  
9 of including or stimulating a public dialogue on this  
10 issue.

11 Again, creating a dialogue before members of  
12 the public isn't going to be sufficient to move forward  
13 in creating additional research in carbon sequestration  
14 but it is going to be absolutely necessary.

15 If there is going to be public support for  
16 this type of process, people have got to be able to  
17 understand it, they've got to be able to participate in  
18 helping create it and bring their ideas to the table.

19 Those are my comments. And, again, we'll be  
20 submitting written comments before the end of the  
21 comment period.

22 MR. LORENZI: Thank you very much.

23 Mike Mudd.

24 - - -

25 MR. MUDD: My name is Mike Mudd, M-U-D-D. I'm

1     Manager of Generation Technologies for American  
2     Electric Power.

3             I'd like to just summarize my comments and  
4     give to you the written comments.

5             I want to speak out and give a full  
6     endorsement of the DOE's carbon management program.

7             Coal is important to our country and to the  
8     State of Ohio, and we truly endorse any R&D that can  
9     reduce the carbon emissions associated with the burning  
10    of coal.

11            For the sake of time, I won't go into more  
12    detail now but other than to speak in favor of any of  
13    the efforts that the Department of Energy is doing with  
14    respect to this. And with that I will give my written  
15    comments for the sake of time tonight. Thank you.

16            MR. LORENZI: The third person registered to  
17    speak is Klaus Lambeck.

18                               - - -

19            MR. LAMBECK: Thank you. My name is  
20    Klaus Lambeck, L-A-M-B-E-C-K. I'm Chief of the Public  
21    Utilities Commission, Division of Facilities, Siting  
22    and Environmental Analysis, and I'm also a Staff Member  
23    of the Ohio Power Siting Board.

24            To keep it in line with everybody else, I will  
25    keep my suggestions or my comments short. I have

1 submitted written comments for the record.

2 Basically, there were four questions or four  
3 points before us. Let me concentrate on three of them  
4 and that is from a siting perspective, not just from a  
5 corporate/state local perspective, I would encourage  
6 the Department to continue to provide support for  
7 regional efforts in the development of energy for  
8 infrastructure. Not just for carbon sequestration R&D  
9 but infrastructure development at large. Transmission  
10 distribution aside from generation does play a huge  
11 role.

12 That leads into the next point and that is  
13 technology development such as FutureGen, which for  
14 this region and many other regions that have the  
15 abundance of coal as their fuel resource available and  
16 are close to load is very, very important, and some  
17 fuel-specific applications should be explored in those  
18 regions.

19 In essence, some technology deployment based  
20 on coal characteristics specifically and use that as  
21 the basis for economic development and economic and  
22 technology analysis to come to a sensible solution to  
23 some of our infrastructure needs as were demonstrated  
24 in our recent blackout, which we I guess in Ohio are  
25 being kind of, sort of blamed for.



1           The funding for the technology deployment, and  
2   I am stressing the word "deployment," not just R&D,  
3   which is essential and should not take away --  
4   deployment should not take away from the basis of  
5   fundamental R&D in this area, but we do need to  
6   re-emphasize and explore incentives that are based on  
7   the three-prong federal/state/industry effort.

8           The State of Ohio has a rich history of  
9   supporting R&D. The P.U.C.O. has never turned down any  
10  request by any of its regulated utilities that came  
11  before us for rate treatment of R&D projects, and I  
12  don't foresee any time in the future that we would not  
13  do such a thing in the future.

14           Thank you.

15           MR. LORENZI: Thanks, Klaus.

16           All comments will, of course, be documented  
17  for this E.I.S. development effort. Some comments may  
18  be just documented and really not addressed if they go  
19  beyond the issues that relate specifically to the  
20  E.I.S. effort. But they certainly will be made known,  
21  they will be made public, and if there are portions of  
22  those comments that are relevant to the P.E.I.S., this  
23  is the Programmatic Environmental Impact Statement,  
24  they will be covered and analyzed in the doctrine.

25           So, I appreciate your comments but recognize

1     that some of them may go beyond the scope of what we  
2     are doing on this particular effort, but we will do our  
3     best to document them and publish them and analyze what  
4     we can.

5             Jackie Bird was the fourth person registered  
6     to speak.

7                     - - -

8             MS. BIRD: Good evening. Keeping with the  
9     90-second testimony rule that everyone seems to have  
10    established, I'm going to truncate this quite a bit.

11            My name is Jackie Bird, B-I-R-D. I'm the  
12    Director of the Ohio Coal Development Office within the  
13    Ohio Air Quality Development Authority. I'm going to  
14    cut to the chase on some of this and submit the written  
15    portion afterwards.

16            Ohio is often pointed to as part of the  
17    problem when emissions from coal-based plants are  
18    discussed. What was seldom pointed out is that Ohio is  
19    also part of the solution and has over the last two  
20    decades put its money where its mouth is and supported  
21    one of the largest state coal R&D programs in the  
22    nation, and along the way engaged in many fruitful  
23    project partnerships with USDOE, which we hope to  
24    continue in the future.

25            Ohio is proud to be in the vanguard again.

1 Over the last several years, Ohio has co-sponsored 27  
2 CO2 R&D projects ranging from lab to field efforts.

3 Ohio has committed nearly \$3 million towards  
4 these efforts, and I am pleased to note that USDOE has  
5 partnered with us on several of these, contributing a  
6 similar amount. The grantees have added another  
7 approximately \$2.2 million.

8 With this backdrop, OCDO wishes to note that  
9 it supports the concepts of the USDOE's carbon  
10 sequestration program and urges you to proceed.

11 A few generic comments:

12 Since CO2 is a global issue, it is quite  
13 appropriate that an international venue such as the  
14 Carbon Sequestration Leadership Forum be pursued.  
15 There will not be true success of anything developed  
16 from this R&D program until it is deployed many times  
17 over, not just in the U.S. but throughout the world.  
18 A venue for the world to participate and contribute is  
19 most appropriate.

20 Each region of the US has its own generic  
21 advantages and disadvantages regarding CO2  
22 sequestration. For this reason, OCDO supports the  
23 concept of the Regional Partnerships. We are also  
24 proud to note that we are a significant co-funder of  
25 the Midwest Carbon Sequestration Partnership, one of

1 seven such partnerships selected last year by USDOE.

2 This partnership is the largest and most  
3 ambitious of the seven, and we expect good things to  
4 come from this, which should be concomitantly served to  
5 lay a good basis for some of the issues associated with  
6 the proposed FutureGen plant.

7 Yes, OCDO supports the concept of a  
8 full-scale sequestration demonstration project that  
9 will capture and store carbon emissions among other  
10 goals, which is known as the FutureGen program. In  
11 fact, we endorse it to such an extent that Ohio is  
12 enthusiastically supporting the siting of the prototype  
13 FutureGen plant here in Ohio.

14 Ohio has all of the advantages such a program  
15 requires: The coal, the geology, the waterways and  
16 water resources, the bulk materials, transportation,  
17 infrastructure, a second-to-none work force, a  
18 university system with a very strong coal R&D  
19 expertise, the nations (which de facto means the  
20 world's) best power siting process, a state EPA  
21 familiar with coal plants, state programs devoted to  
22 coal R&D and clean air, and the ability to offer both  
23 funding and tax incentives for such a project.

24 We support the concept of a FutureGen plant  
25 and we support its becoming a reality through its

1     siting here in Ohio.

2                 USDOE is correct that there is seldom a  
3     silver bullet for a matter as dynamic as CO2  
4     sequestration, and therefore, we support a carbon  
5     sequestration core R&D program that will develop the  
6     portfolio of technologies for different techniques such  
7     as terrestrial, geologic and oceanic sequestration.

8                 From Ohio's point of view, we are most  
9     interested in the first of these. However, we do  
10    inject a few notes of caution.

11                While Ohio supports all of the above, it also  
12    strongly reiterates the need for USDOE's basic coal R&D  
13    program. Many of the antecedents to FutureGen are  
14    presently found in the base coal R&D program. Just one  
15    example is the Ultra Super Critical Materials  
16    Consortium, which OCDO is co-funding along with USDOE.  
17    These pieces of research are absolutely necessary for  
18    the eventual success and deployment of a FutureGen  
19    plant. Do not budgetarily rob Peter to pay Paul.

20                Cutting funds from the base coal R&D program  
21    to fund FutureGen is counterproductive. One cannot  
22    expect to succeed in college if he's not learned his  
23    necessary lessons in grades 1 through 12.

24                Remember the existing coal fleet. It is not  
25    going to go away anytime soon and it still has issues

1 that need to be addressed. Some funding should be  
2 allocated for concerns associated with combustion  
3 facilities.

4 Remember the smaller units. We are getting  
5 an increasing number of calls from small generators who  
6 want to environmentally upgrade the mid- and small-size  
7 units.

8 Interestingly, with the increasing up tick in  
9 the price of natural gas, we are also getting interest  
10 in those who would like to go back to coal. Consider  
11 them in your overall programs as well.

12 Thank you for your time and attention to  
13 these matters.

14 MR. LORENZI: Thank you for your comments.

15 A wide range of issues which people in the  
16 Department of Energy are well aware of. I might just  
17 mention one thing about the FutureGen project.

18 Scott mentioned FutureGen, Jackie Bird  
19 mentioned FutureGen. The FutureGen project is really  
20 on a separate pathway of implementation, and this  
21 particular Environmental Impact Statement will not  
22 address FutureGen development effort. There will be  
23 plans to develop a separate E.I.S. that deals with all  
24 of the issues related to FutureGen: technological,  
25 sequestration, site location. But thank you for your

1     comments.

2                   MS. BIRD: May I add one P.S.?

3                   MR. LORENZI: You may, yes.

4                   MS. BIRD: On monitoring and verification,  
5     please keep that simple. If it ends up like the IRS  
6     Tax Code, no one will use it and the program will be  
7     less than successful.

8                   MR. LORENZI: Thank you.

9                   Are these the extent of your written  
10    comments?

11                  MS. BIRD: Yes, those are them.

12                  MR. LORENZI: Okay. The next individual  
13    requested to speak is Elizabeth Shaw.

14                                 - - -

15                  MS. SHAW: Good evening. I'm a little  
16    shorter than some of the other people here. My name is  
17    Elizabeth Shaw, S-H-A-W. I am the Manager for Energy  
18    Supply Technologies for FirstEnergy. And in keeping  
19    with everybody else, I'm going to kind of abbreviate my  
20    comments. I did leave a copy with the staff person at  
21    the table, so my comments have been provided already.

22                  FirstEnergy owns and operates 20 power  
23    plants. We have a combined capacity of over 13,000  
24    megawatts of electricity. About 55 percent of that  
25    capacity is coal. And so while we do have nuclear, we

1 do have hydro, and we do have natural gas, coal is a  
2 significant part of our portfolio. And so even though  
3 we're diversified, we think that solving the  
4 environmental issues around coal is very important to  
5 us.

6 We've already spent significant amounts of  
7 money since the Clean Air Act was passed to address  
8 environmental concerns and achieve significant  
9 reductions, and so we support the efforts of DOE to try  
10 to address the global climate change emissions.

11 Achieving meaningful reductions of carbon  
12 dioxide will require a combined approach, including  
13 cost-effective control technologies, increased fuel  
14 efficiency, lower emitting and renewable sources,  
15 advanced electro-technologies, terrestrial  
16 sequestration through tree planting and other land  
17 management efforts, geological sequestration, and a  
18 market-based trading program.

19 We think all of those different facets are  
20 necessary to address these tremendous issues.

21 We support the efforts of USDOE to understand  
22 the potential benefits and costs of carbon capture and  
23 sequestration, and we think that the effort of DOE will  
24 be important to develop a meaningful reduction strategy  
25 for this nation.



1           We believe that any policies designed to  
2   address the global climate change issue should, number  
3   one, provide flexibility in meeting emission reduction  
4   goals; should also include reasonable compliance  
5   schedules to encourage the development of realistic,  
6   cost-effective control technologies and  
7   energy-efficient electro-technologies; should also be  
8   applied across a broad geographic region, recognizing  
9   that climate change is a global issue; should provide  
10   incentives for technological developments; and should  
11   also recognize and allow the registration for early  
12   actions that have already been taken.

13           We at FirstEnergy have taken a significant  
14   number of steps over the last 10 or 11 years to reduce  
15   our global climate change emissions and we would like  
16   for those actions to be recognized.

17           We encourage the Department of Energy to  
18   continue its work to develop cost-effective,  
19   commercially ready and environmentally sound technology  
20   options to reduce greenhouse gases.

21           We believe that major technological advances  
22   are needed to achieve the reduction of the goal of  
23   stabilizing CO2 levels. The concerted, collaborative  
24   efforts of the DOE and other stakeholders are vital to  
25   meeting that goal.

1           We did review the Programmatic Environmental  
2   Impact Statement as described in the Federal Register  
3   Notice of Intent and we agree with all of the things  
4   that have been detailed. We would recommend one  
5   additional item to be considered.

6           We would recommend that the PEIS also include  
7   the potential socioeconomic impacts of the increased  
8   cost of energy as a result of CO2 capture and  
9   sequestration.

10          We are confident that a reasonable climate  
11   change policy, one that includes thorough economic,  
12   scientific and environmental review, can be achieved  
13   through the type of public-private partnerships that  
14   the DOE has initiated with this carbon sequestration  
15   program.

16          The rest of my comments are in detail. They  
17   are in the written submittal that I provided, and we  
18   may be providing more comments before the deadline.  
19   Thank you for the opportunity to comment.

20          MR. LORENZI: Thank you for providing your  
21   comments.

22          One question. The written comments, are they  
23   out front?

24          MS. SHAW: I placed them in the box.

25          MR. LORENZI: Okay. That's fine.

1 MS. SHAW: The staff person that was out there  
2 took them, yes.

3 MR. LORENZI: Thank you very much and I  
4 appreciate your comments on that. Those were very good  
5 comments and we appreciate it.

6 MS. SHAW: Thank you.

7 MR. LORENZI: The final registered person is  
8 Rattan Lal, L-A-L.

9 - - -

10 MR. LAL: Mr. Chairman, my name is Rattan Lal,  
11 L-A-l, Professor of Soil Science and Director of the  
12 Carbon Management Sequestration Center at Ohio State.

13 I endorse very strongly the carbon  
14 sequestration program that the DOE and NETL has, and I  
15 especially endorse the work that they are doing on  
16 terrestrial carbon sequestration through the  
17 partnerships that were mentioned here.

18 I would like to mention that restoration of  
19 degraded soils in ecosystems, including mine soils,  
20 which are a very important activity in Ohio in our  
21 partnership region, is a very important strategy of  
22 carbon sequestration.

23 In the United States the terrestrial  
24 ecosystems of agricultural soils lost somewhere about 5  
25 billion tons of carbon since the settlement of

1 agriculture about 200 years ago, compared to the global  
2 loss of about 80 billion tons, and we have the  
3 potential to sequester that carbon through restoration  
4 and management of the agricultural soils. And some of  
5 the activities funded by the programs such as the one  
6 we're talking about have estimated that in Ohio the  
7 potential for terrestrial carbon sequestration is about  
8 10 million metric tons of carbon a year.

9 In the United States the potential for  
10 terrestrial carbon sequestration in soils is about 300  
11 million metric tons of carbon a year and in the world  
12 it's about one billion tons of carbon per year. This  
13 potential can be achieved somewhere in 25 to 50 years.

14 For the 300 million tons of carbon  
15 sequestration potential for the United States at  
16 present only 20 million tons is being realized. So we  
17 have a lot of opportunity to achieve that.

18 There were several questions raised here, and  
19 I think Jackie Bird talked about monitoring and  
20 verification should be simple, and I fully support  
21 that. And I think terrestrial carbon sequestration  
22 could be as simple as to evaluate the land use.  
23 Because we can tie the carbon sequestrational rate and  
24 assessment to simply knowing what land use and what  
25 practices are being followed.

1           Another important part of this is they should  
2   be safe and environmentally friendly as one speaker  
3   mentioned that.

4           This practice of terrestrial carbon  
5   sequestration is not only safe, it is absolutely  
6   necessary to be able to feed six billion people of the  
7   world now, and perhaps 10 billion 50 years from now.

8           Thank you, Mr. Chairman.

9           MR. LORENZI: Thank you very much.

10          Are there other individuals who would like to  
11   make comments tonight about the sequestration program  
12   or the development of this Environmental Impact  
13   Statement?

14          Don't be bashful. This is a good opportunity  
15   to provide oral comments. However, if you choose not  
16   to tonight, you can provide comments up until the June  
17   25th cutoff date, but we would encourage you to take  
18   advantage of this opportunity tonight.

19          No one is desiring to speak. In that case,  
20   I'll just remind you again, June 25th is the cutoff  
21   date, and with that final comment we'll draw this  
22   meeting to a close.

23          I wish you all safe travel back to your  
24   residence and, hopefully, it will be dry outside.  
25   I thank you very much for your participation, and at

1 8:00 by my watch we'll call the meeting to a close.

2 Thank you.

3 - - -

4 Thereupon, at 8:00 p.m., on Tuesday,  
5 May 18, 2004, the public hearing was concluded.

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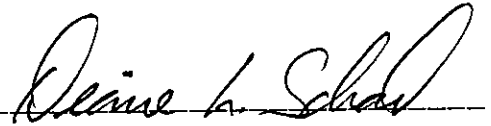
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## CERTIFICATE

- - -

I do hereby certify that the foregoing is a true and correct transcript of the proceedings in this matter on Tuesday, May 18, 2004, taken by me and transcribed from my stenographic notes.

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Diane L. Schad, Court  
Reporter.

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|---|---|--|---|--|---|
| <b>A</b><br>abbreviate 38:19<br>ability 20:10<br>35:22<br>able 10:8 14:4<br>20:6,7,13 27:4<br>29:16,17 44:6<br>about 8:9,19<br>10:13 11:3,11<br>11:13 13:5,14<br>14:16 16:17<br>17:23 20:4<br>22:15 23:5,5,20<br>27:18,19 29:1<br>37:17 38:24<br>42:24 43:1,2,6<br>43:7,10,12,19<br>44:11<br>above 25:2 36:11<br>absolutely 28:17<br>29:14 36:17<br>44:5<br>abundance 31:15<br>acceptable 19:23<br>account 20:14<br>accounting 13:14<br>accounts 11:3<br>accrue 25:19<br>achieve 4:18 5:3<br>39:8 40:22<br>43:17<br>achieved 41:12<br>43:13<br>Achieving 39:11<br>across 40:8<br>Act 39:7<br>action 5:4<br>actions 40:12,16<br>activities 4:17<br>6:18 7:17 8:3<br>8:16 13:22<br>20:24 21:20,24<br>22:8,10,12 43:5<br>activity 22:5 23:4<br>42:20<br>actually 28:11<br>add 13:3 38:2<br>added 34:6<br>additional 29:13<br>41:5<br>address 23:2 27:3<br>28:17 37:22<br>39:7,10,20 40:2<br>addressed 32:18<br>37:1<br>Addressing 24:9<br>adds 25:15 | <b>Administration</b><br>16:16<br><b>administrative</b><br>5:23<br><b>advanced</b> 39:15<br><b>advances</b> 40:21<br><b>advantage</b> 44:18<br><b>advantages</b> 34:21<br>35:14<br><b>affiliation</b> 28:1<br><b>afforestation</b><br>19:14<br><b>after</b> 7:22<br><b>afterwards</b> 33:15<br><b>again</b> 8:7 11:11<br>19:17 29:11,19<br>33:25 44:20<br><b>agency</b> 21:20<br>22:2,2<br><b>ago</b> 7:24 10:18<br>23:6 27:11 43:1<br><b>agree</b> 41:3<br><b>agricultural</b><br>10:19 42:24<br>43:4<br><b>agriculture</b> 19:15<br>22:7 43:1<br><b>air</b> 9:5 26:5 33:13<br>35:22 39:7<br><b>allocated</b> 37:2<br><b>allow</b> 24:15 40:11<br><b>allowing</b> 20:6<br><b>almost</b> 14:21<br><b>alone</b> 16:4<br><b>along</b> 33:22<br>36:16<br><b>already</b> 38:21<br>39:6 40:12<br><b>ambitious</b> 35:3<br><b>American</b> 18:25<br>30:1<br><b>among</b> 35:9<br><b>amount</b> 17:6<br>20:10 34:6<br><b>amounts</b> 39:6<br><b>analysis</b> 6:12 7:1<br>18:14,18 19:7,7<br>19:11 30:22<br>31:22<br><b>analyze</b> 33:3<br><b>analyzed</b> 32:24<br><b>announced</b> 4:19<br><b>Annual</b> 17:23<br><b>another</b> 10:3,8<br>13:3,15 14:6<br>17:1 19:6 21:19<br>23:3 34:6 44:1 | <b>antecedents</b><br>36:13<br><b>anthropogenic</b><br>13:10<br><b>anything</b> 34:15<br><b>anytime</b> 36:25<br><b>APPEARANC...</b><br>2:1<br><b>applications</b><br>31:17<br><b>applied</b> 21:9 40:8<br><b>apply</b> 24:12<br><b>appreciate</b> 7:22<br>28:23 32:25<br>42:4,5<br><b>approach</b> 39:12<br><b>approaches</b><br>18:11<br><b>appropriate</b><br>34:13,19<br><b>approximately</b><br>34:7<br><b>area</b> 23:9,14,15<br>32:5<br><b>around</b> 4:15 39:4<br><b>arranged</b> 4:3<br><b>arrow</b> 12:19<br><b>aside</b> 31:10<br><b>aspect</b> 29:4<br><b>assessment</b> 43:24<br><b>assist</b> 4:7 7:6<br><b>Assisting</b> 5:20<br><b>associated</b> 30:9<br>35:5 37:2<br><b>atmosphere</b> 8:25<br>12:9<br><b>attendance</b> 5:11<br>6:22 7:22<br><b>attention</b> 14:8<br>37:12<br><b>audiences</b> 26:14<br><b>Authority</b> 33:13<br><b>available</b> 7:11<br>19:18 23:17<br>26:16 31:15<br><b>AVENUE</b> 2:12<br><b>aware</b> 37:16<br><b>away</b> 12:14 15:25<br>18:6 32:3,4<br>36:25 | 36:20<br><b>based</b> 12:5 31:19<br>32:6<br><b>base-lining</b> 24:2<br><b>bashful</b> 44:14<br><b>basic</b> 21:2 36:12<br><b>Basically</b> 31:2<br><b>basics</b> 21:6<br><b>basin</b> 31:21<br><b>basis</b> 27:4 32:4<br>35:5<br><b>bear</b> 19:10<br><b>becoming</b> 35:25<br><b>before</b> 7:12,15<br>29:11,20 31:3<br>32:11 41:18<br><b>begin</b> 4:2 7:15<br><b>behalf</b> 28:2,8<br><b>being</b> 9:17,18<br>10:8 15:5 20:17<br>22:13 31:25<br>43:16,25<br><b>believe</b> 18:4,7<br>28:16,19 40:1<br>40:21<br><b>beneath</b> 9:20<br><b>benefit</b> 8:16<br>27:25<br><b>benefits</b> 25:4,6,18<br>39:22<br><b>benign</b> 23:24<br><b>best</b> 33:3 35:20<br><b>Bethesda</b> 2:14<br><b>better</b> 20:13<br><b>beyond</b> 29:8<br>32:19 33:1<br><b>big</b> 17:18<br><b>billion</b> 17:24<br>42:25 43:2,12<br>44:6,7<br><b>billions</b> 20:12<br><b>billion-dollar</b><br>25:24<br><b>Bird</b> 3:11 33:5,8<br>33:11 37:18<br>38:2,4,11 43:19<br><b>bit</b> 8:9 33:10<br><b>black</b> 12:12<br><b>blackout</b> 31:24<br><b>blamed</b> 31:25<br><b>blue</b> 12:13<br><b>Board</b> 30:23<br><b>both</b> 4:21 8:10<br>9:1 12:11 15:16<br>35:22<br><b>bottom</b> 12:20<br>14:8 19:15 | <b>box</b> 20:22 21:1,9<br>22:6 41:24<br><b>brackish</b> 9:15<br>25:13<br><b>breakout</b> 13:9<br><b>break-through</b><br>22:18<br><b>brief</b> 28:13<br><b>bring</b> 29:18<br><b>broad</b> 22:13 24:3<br>40:8<br><b>brought</b> 10:12<br><b>brunt</b> 19:10<br><b>BTUs</b> 11:25<br><b>BTU's</b> 12:2<br><b>bubble</b> 22:16<br><b>budgetarily</b><br>36:19<br><b>build</b> 25:24<br><b>bulk</b> 13:22 35:16<br><b>bullet</b> 36:3<br><b>bunch</b> 21:19<br><b>burn</b> 11:21<br><b>burning</b> 11:24<br>30:9<br><b>B-I-R-D</b> 33:11 | 18:22 22:9 23:7<br>26:19,24 28:15<br>28:21 29:2,13<br>30:6,9 31:8<br>34:9,14,25 35:9<br>36:4 39:11,22<br>41:14 42:12,13<br>42:16,22,25<br>43:3,7,8,10,11<br>43:12,14,21,23<br>44:4<br><b>carbonate</b> 10:13<br><b>carbonates</b> 10:10<br><b>carbon-based</b><br>15:14<br><b>care</b> 29:1<br><b>Carey</b> 2:10 6:3,4<br><b>cars</b> 15:17<br><b>case</b> 44:19<br><b>categories</b> 9:7<br>22:18<br><b>caution</b> 36:10<br><b>Center</b> 1:7 42:12<br><b>centuries</b> 18:10<br><b>century</b> 18:8,9,16<br><b>certain</b> 17:6<br><b>certainly</b> 7:21<br>19:22 32:20<br><b>CERTIFICATE</b><br>46:1<br><b>certify</b> 46:2<br><b>cetera</b> 21:22<br><b>Chairman</b> 42:10<br>44:8<br><b>challenging</b><br>21:25<br><b>change</b> 4:19 12:7<br>16:14,17,20<br>17:11 20:21,23<br>39:10 40:2,9,15<br>41:11<br><b>changes</b> 10:5<br><b>characteristics</b><br>31:20<br><b>charge</b> 27:2<br><b>chart</b> 10:24 11:10<br>12:15 13:8,12<br>14:6 17:20<br>18:13<br><b>charts</b> 10:24<br>17:25<br><b>chase</b> 33:14<br><b>chemical</b> 10:9<br><b>Chief</b> 30:20<br><b>choose</b> 44:15<br><b>clean</b> 5:1 25:14<br>35:22 39:7 |
|   |   | <b>B</b>   |   | <b>C</b>   |   |
|   |   | back 37:10 44:23<br>backdrop 34:8<br>balance 4:25<br>bar 18:2,3<br>base 4:24 36:14   |   | call 9:11 15:9<br>23:6,21 45:1<br>called 9:14 10:10<br>11:21,25 13:15<br>16:13,22 17:5<br>20:20 21:9 23:1<br>23:3,9<br>calls 37:5<br>came 9:6 32:10<br>Canadian 23:12<br>candidate 9:10<br>capacities 17:13<br>25:15<br>capacity 17:22<br>18:4,8,9 19:20<br>38:23,25<br>capture 8:23 9:1<br>9:3,7 15:1,2,6<br>15:23 22:18<br>26:8 35:9 39:22<br>41:8<br>capturing 9:5<br>carbon 1:3 4:12<br>4:17,22,25 5:2<br>6:19 7:2,17 8:2<br>8:9,19 10:20<br>11:21 13:17<br>15:8,11,22<br>16:18 17:2   |   |



|  |   |   |  |   |  |
|--|---|---|--|---|--|
| <b>Clear</b> 16:22<br><b>climate</b> 4:19 12:7<br>16:13,17,20<br>17:11 20:21,23<br>28:17 39:10<br>40:2,9,15 41:10<br><b>close</b> 14:11 31:16<br>44:22 45:1<br><b>clue</b> 24:12<br><b>coal</b> 9:15 11:13<br>14:3,10,21,23<br>14:23 15:3,14<br>26:1,2,4 30:7<br>30:10 31:15,20<br>33:12,21 35:15<br>35:18,21,22<br>36:12,14,20,24<br>37:10 38:25<br>39:1,4<br><b>coal-based</b> 33:17<br><b>Cockrans</b> 2:6<br><b>Code</b> 38:6<br><b>coincidentally</b><br>11:5<br><b>collaborative</b><br>40:23<br><b>college</b> 36:22<br><b>COLUMBUS</b> 1:7<br>1:9<br><b>combined</b> 38:23<br>39:12<br><b>combustion</b> 37:2<br><b>come</b> 8:15 15:1<br>31:22 35:4<br><b>comes</b> 26:24<br><b>coming</b> 21:10<br><b>comment</b> 5:8<br>6:23 7:11 28:24<br>29:8,21 41:19<br>44:21<br><b>commentors</b><br>27:17<br><b>comments</b> 5:6,7<br>6:9,24,25 7:4,5<br>7:15,20 27:10<br>27:13,18,22<br>28:2,8,12,13<br>29:19,20 30:3,4<br>30:15,25 31:1<br>32:16,17,22,25<br>34:11 37:14<br>38:1,10,20,21<br>41:16,18,21,22<br>42:4,5 44:11,15<br>44:16<br><b>commercially</b><br>40:19 | <b>Commission</b><br>30:21<br><b>committed</b> 34:3<br><b>Company</b> 5:24<br><b>compared</b> 43:1<br><b>completed</b> 7:13<br><b>completion</b> 7:9<br>7:10<br><b>compliance</b> 2:3<br>40:4<br><b>component</b> 13:15<br>13:25 14:1<br>20:25<br><b>concentrate</b> 31:3<br><b>concentration</b><br>12:13 13:5<br><b>concentrations</b><br>12:8,17,23,25<br><b>concept</b> 23:18<br>34:23 35:7,24<br><b>concepts</b> 8:8<br>22:19 27:7 34:9<br><b>concern</b> 12:24<br><b>concerned</b> 17:21<br>20:4<br><b>concerns</b> 37:2<br>39:8<br><b>concerted</b> 40:23<br><b>concluded</b> 45:5<br><b>concomitantly</b><br>35:4<br><b>confident</b> 41:10<br><b>confined</b> 27:12<br><b>conservative</b> 18:7<br><b>Consider</b> 37:10<br><b>considered</b> 9:18<br>41:5<br><b>Consortium</b><br>36:16<br><b>contain</b> 11:21<br>26:17<br><b>contains</b> 10:13<br><b>content</b> 6:11<br><b>continuation</b><br>29:8<br><b>continue</b> 31:6<br>33:24 40:18<br><b>contribute</b> 14:7<br>34:18<br><b>contributes</b> 14:16<br><b>contributing</b> 34:5<br><b>contribution</b><br>14:12<br><b>control</b> 39:13<br>40:6<br><b>CONVENTION</b><br>1:7 | <b>convert</b> 10:8,10<br><b>coordinate</b> 21:24<br><b>coordinating</b><br>20:22<br><b>copy</b> 38:20<br><b>core</b> 22:16 36:5<br><b>corners</b> 15:10<br><b>corporate/state</b><br>31:5<br><b>Corporation</b> 6:6<br><b>correct</b> 36:2 46:3<br><b>cost</b> 41:8<br><b>costs</b> 39:22<br><b>cost-effective</b><br>23:24 39:13<br>40:6,18<br><b>Council</b> 28:8,9<br><b>counterproduc...</b><br>36:21<br><b>countries</b> 13:20<br><b>country</b> 4:15<br>19:2 23:15,16<br>23:19 24:3 30:7<br><b>couple</b> 13:1<br><b>course</b> 32:16<br><b>court</b> 6:7 27:25<br>46:7<br><b>covered</b> 32:24<br><b>co-funder</b> 34:24<br><b>co-funding</b> 36:16<br><b>co-sponsored</b><br>34:1<br><b>CO2</b> 8:24 9:5,19<br>10:2,8,10,13,16<br>11:22 12:5,8,13<br>12:16,23,25<br>13:4,12,23 14:7<br>15:1,7 18:5<br>20:7,10,12<br>22:22 25:7,8,16<br>25:16 26:8 34:2<br>34:12,21 36:3<br>40:23 41:8<br><b>create</b> 29:18<br><b>creating</b> 29:11,13<br><b>criteria</b> 16:23<br><b>Critical</b> 36:15<br><b>critically</b> 16:2<br><b>current</b> 6:18 10:4<br><b>currently</b> 7:9<br><b>cut</b> 33:14<br><b>cutoff</b> 44:17,20<br><b>C02</b> 13:17 24:16<br><hr/> <b>D</b><br><b>dark</b> 18:2<br><b>date</b> 44:17,21 | <b>day</b> 16:21,22<br>24:20<br><b>day's</b> 7:23<br><b>de</b> 35:19<br><b>deadline</b> 41:18<br><b>deal</b> 9:13 10:15<br>14:4 16:2,6,19<br>19:18 21:18<br>24:17<br><b>dealing</b> 15:8<br>17:10 23:1<br><b>deals</b> 14:1 37:23<br><b>dealt</b> 16:23<br><b>decades</b> 33:20<br><b>decide</b> 16:7<br><b>decisions</b> 4:25<br>24:18<br><b>deep</b> 9:19<br><b>defining</b> 4:10<br><b>degraded</b> 42:19<br><b>demand</b> 15:16<br><b>demonstrated</b><br>31:23<br><b>demonstration</b><br>35:8<br><b>dent</b> 17:19<br><b>Department</b> 1:1<br>2:4 4:4,7,18 5:4<br>5:13,15,18,20<br>6:16,18 7:16,25<br>8:3,15 20:18,20<br>20:23 21:3 22:7<br>25:23 30:13<br>31:6 37:16<br>40:17<br><b>deploy</b> 23:25<br>24:1<br><b>deployed</b> 34:16<br><b>deployment</b><br>21:14 23:22<br>25:20 31:19<br>32:1,2,4 36:18<br><b>depth</b> 22:15<br><b>described</b> 41:2<br><b>descriptions</b> 6:15<br><b>designed</b> 40:1<br><b>desired</b> 6:11<br><b>desiring</b> 44:19<br><b>desperate</b> 25:12<br><b>detail</b> 16:1 23:2<br>30:12 41:16<br><b>detailed</b> 4:5<br>26:17 41:4<br><b>determining</b> 25:4<br><b>develop</b> 23:21<br>24:14 36:5<br>37:23 39:24 | 40:18<br><b>developed</b> 13:19<br>34:15<br><b>developing</b> 14:4<br>20:5 21:15<br><b>development</b><br>4:11,21 14:19<br>28:24 31:7,9,13<br>31:21 32:17<br>33:12,13 37:22<br>40:5 44:12<br><b>developments</b><br>40:10<br><b>develops</b> 22:21<br><b>devoted</b> 35:21<br><b>dialogue</b> 29:9,11<br><b>Diane</b> 46:7<br><b>different</b> 22:12<br>36:6 39:19<br><b>difficult</b> 8:20<br><b>diligent</b> 29:3<br><b>dioxide</b> 4:13<br>13:17 39:12<br><b>direction</b> 16:10<br><b>Director</b> 33:12<br>42:11<br><b>disadvantages</b><br>34:21<br><b>discharges</b> 20:4<br><b>discuss</b> 8:2,8<br><b>discussed</b> 33:18<br><b>dissolution</b> 10:2<br>10:5<br><b>dissolving</b> 9:19<br><b>distribution</b> 14:2<br>31:10<br><b>diverse</b> 26:14<br><b>diversified</b> 39:3<br><b>divide</b> 14:14<br><b>divided</b> 11:12<br>15:9 22:17<br><b>Division</b> 30:21<br><b>doctrine</b> 32:24<br><b>document</b> 6:10<br>33:3<br><b>documented</b><br>32:16,18<br><b>DOE</b> 8:5 13:21<br>39:9,23 40:24<br>41:14 42:14<br><b>DOE's</b> 6:17 30:6<br><b>doing</b> 30:13 33:2<br>42:15<br><b>done</b> 18:18<br><b>door</b> 6:14 27:16<br><b>down</b> 20:14 32:9<br><b>draft</b> 7:8,12 | <b>draw</b> 44:21<br><b>drinking</b> 25:14<br><b>drives</b> 16:10<br><b>driving</b> 25:17<br><b>dry</b> 44:24<br><b>dynamic</b> 36:3<br><hr/> <b>E</b><br><b>each</b> 12:17 14:11<br>34:20<br><b>earlier</b> 15:23<br><b>early</b> 40:11<br><b>economic</b> 4:25<br>31:21,21 41:11<br><b>economically</b><br>20:16<br><b>economy</b> 4:23<br><b>ecosystems</b> 19:25<br>20:1 42:19,24<br><b>effective</b> 4:24<br><b>efficiency</b> 15:15<br>15:17,18,19<br>19:15 28:20<br>39:14<br><b>effort</b> 5:9 7:1<br>26:15 32:7,17<br>32:20 33:2<br>37:22 39:23<br><b>efforts</b> 30:13 31:7<br>34:2,4 39:9,17<br>39:21 40:24<br><b>eight</b> 4:14 5:7<br>19:2,4 23:5<br><b>Electric</b> 30:2<br><b>electricity</b> 14:15<br>14:22 15:20<br>18:25 26:1<br>38:24<br><b>electronic</b> 26:23<br><b>electronically</b><br>26:25<br><b>electro-technol...</b><br>39:15 40:7<br><b>Elizabeth</b> 3:12<br>38:13,17<br><b>emerging</b> 8:14<br><b>emission</b> 13:10<br>13:11 40:3<br><b>emissions</b> 12:4<br>13:9 14:1,7,17<br>16:6 17:2,16,19<br>17:23,24 18:17<br>18:19,20 19:5,9<br>19:10,14,17<br>22:20 30:9<br>33:17 35:9<br>39:10 40:15 |
|--|---|---|--|---|--|

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| emit 19:2 26:5<br>emitted 8:25<br>emitting 12:4<br>39:14<br>employee 5:12<br>encompass 23:12<br>encourage 6:21<br>29:7 31:5 40:5<br>40:17 44:17<br>end 5:8 7:10<br>11:17 26:11<br>29:8,20<br>endorse 30:8<br>35:11 42:13,15<br>endorsement<br>30:6<br>ends 27:7 38:5<br>energy 1:1,2 2:4<br>2:5 4:4,8,18 5:1<br>5:16,18,18,21<br>6:16 7:16,25<br>8:1,4,4,10<br>10:22,25,25<br>11:3,4,6,11<br>13:23 14:7<br>15:13 20:19<br>21:9 28:20,20<br>30:13 31:7<br>37:16 38:17<br>40:17 41:8<br>Energy's 5:4,13<br>6:18<br>energy-efficient<br>40:7<br>engaged 33:22<br>Engineering 2:11<br>5:24 6:4<br>enhance 25:7,8<br>enhanced 10:19<br>enhancing 15:24<br>ensure 29:3<br>enthusiastically<br>35:12<br>entrance 6:13<br>environment<br>29:4<br>environmental<br>1:4 4:6,6,10 5:5<br>5:10,21,23 6:11<br>6:17 7:1,6,8<br>8:17 9:23 21:11<br>21:17 22:2 24:9<br>28:8,9,10,25<br>29:1,2 30:22<br>32:23 37:21<br>39:4,8 41:1,12<br>44:12 | environmentally<br>19:23 23:24<br>37:6 40:19 44:2<br>EPA 22:1,5 35:20<br>especially 42:15<br>essence 5:3 31:19<br>essential 32:3<br>essentially 8:23<br>14:9 23:21<br>Establish 24:13<br>established 23:6<br>23:8 33:10<br>establishing 4:9<br>24:24<br>establishment<br>4:23<br>estimated 43:6<br>estimates 18:7<br>et 21:22<br>evaluate 26:3<br>43:22<br>evaluating 4:9<br>even 18:7 20:4<br>24:11 25:10<br>29:8 39:2<br>evening 6:3 7:22<br>8:6 23:11 33:8<br>38:15<br>eventual 36:18<br>every 24:22 29:4<br>everybody 30:24<br>38:19<br>everyone 7:21<br>33:9<br>Everything 21:21<br>example 9:2,4<br>15:16 20:1,12<br>22:1 24:18<br>25:11 36:15<br>examples 21:23<br>22:1<br>exclusively 14:21<br>exist 9:9 17:13,18<br>18:4 22:12<br>existing 36:24<br>expect 35:3 36:22<br>expected 26:14<br>expertise 35:19<br>explore 32:6<br>explored 31:17<br>extent 27:18<br>35:11 38:9<br>e-mail 27:3<br>E.I.S 32:17,20<br>37:23 | facets 39:19<br>facilities 30:21<br>37:3<br>facility 25:25,25<br>fact 23:23 35:11<br>facto 35:19<br>familiar 35:21<br>farming 22:8<br>fate 20:7 22:22<br>favor 30:12<br>Federal 41:2<br>federal/state/in...<br>32:7<br>feed 44:6<br>feel 27:13<br>few 7:24 10:17<br>16:5 17:18<br>27:10 34:11<br>36:10<br>field 8:16 23:4<br>34:2<br>figure 11:2<br>final 7:13 42:7<br>44:21<br>finalized 7:12<br>find 25:3 26:20<br>fine 41:25<br>first 15:5 16:16<br>28:3,14 36:9<br>FirstEnergy<br>38:18,22 40:13<br>five 27:18<br>fleet 36:24<br>flexibility 40:3<br>fluid 25:17<br>focus 13:22<br>focused 17:2<br>focusing 13:25<br>follow 6:16<br>followed 19:12<br>19:14 43:25<br>following 6:24<br>force 35:17<br>forecasts 12:5<br>foregoing 46:2<br>foresee 32:12<br>forester 24:21<br>form 6:21<br>formation 24:16<br>26:9<br>formations 9:16<br>24:4,5,6 25:14<br>Forum 34:14<br>forward 8:18<br>16:5 21:10<br>28:22 29:5,12<br>fossil 1:2 8:4,10 | 10:22,25 11:3<br>11:12,16,20,22<br>14:6,10 21:9<br>found 36:14<br>four 31:2,2<br>fourth 33:5<br>framework 4:9<br>Fred 2:10 6:3<br>free 26:23 27:2<br>friendly 44:2<br>from 5:7,13,15<br>6:10 8:11,16<br>9:6,8 10:4,25<br>11:8 12:14,20<br>13:3,9,12,23<br>14:2,19 15:14<br>15:25 16:9<br>17:15,25 18:6<br>18:23 21:21<br>22:13 25:13<br>26:2 31:4,4,10<br>32:4 33:17 34:2<br>34:16 35:4 36:8<br>36:20 37:5 44:7<br>46:5<br>front 41:23<br>front-running<br>9:10<br>fruitful 33:22<br>fuel 14:10 15:13<br>15:14 31:15<br>39:13<br>fuels 10:25 11:12<br>11:16,20,22<br>14:7<br>fuel-specific<br>31:17<br>fugitive 14:1<br>19:13 22:3,20<br>full 30:5<br>fully 43:20<br>full-scale 35:8<br>function 20:22<br>fund 36:21<br>fundamental<br>21:2,6 32:5<br>funded 43:5<br>funding 32:1<br>35:23 37:1<br>funds 36:20<br>future 4:11 11:9<br>13:2 19:24<br>21:14 32:12,13<br>33:24<br>FutureGen 23:3<br>25:21 26:10<br>31:13 35:6,10 | 35:13,24 36:13<br>36:18,21 37:17<br>37:18,19,19,22<br>37:24<br><hr/> G<br>gap 18:20 19:3<br>23:14<br>gas 8:10 9:13<br>11:13,23 12:4<br>13:9,18 14:2,11<br>14:16 16:6 17:2<br>17:6 26:7 37:9<br>39:1<br>gases 8:24 9:10<br>13:13 18:12<br>19:13 22:3,4,19<br>22:23 26:6<br>40:20<br>general 9:7<br>generate 15:20<br>generation 14:24<br>14:24 15:3 30:1<br>31:10<br>generations<br>19:25<br>generators 37:5<br>generic 34:11,20<br>geographic 40:8<br>geologic 9:11<br>20:13 21:21<br>23:16 24:4,16<br>26:9 36:7<br>geological 9:16<br>39:17<br>geology 35:15<br>gets 17:12 18:11<br>25:19<br>getting 21:16<br>37:4,9<br>gigatons 17:24<br>give 10:22 12:6<br>30:4,5,14<br>gives 14:11<br>global 4:19 16:20<br>17:11 34:12<br>39:10 40:2,9,15<br>43:1<br>go 8:11,12,14<br>11:15 12:1 16:4<br>21:11 24:22<br>25:2 27:20<br>30:11 32:18<br>33:1 36:25<br>37:10<br>goal 40:22,25<br>goals 4:18 5:3 | 35:10 40:4<br>goes 12:19<br>going 8:1,7,8,18<br>11:9,19 12:1,4<br>16:7 17:14 19:9<br>21:7,16 22:24<br>28:12,19 29:12<br>29:14,15 33:10<br>33:13 36:25<br>38:19<br>gone 12:23<br>good 6:3 10:6<br>24:7 27:5 33:8<br>35:3,5 38:15<br>42:4 44:14<br>government<br>20:18 21:20,25<br>22:12<br>grades 36:23<br>grantees 34:6<br>graph 12:10<br>grasp 24:7<br>GREATER 1:7<br>greenhouse 8:10<br>8:24 9:9 11:23<br>12:3 13:9,13,18<br>14:16 16:6 17:2<br>17:6 18:12<br>19:13 22:3,19<br>22:23 26:5,7<br>40:20<br>ground 9:12<br>20:12 22:9 25:7<br>25:8<br>group 21:12<br>growth 5:1<br>guess 21:1 31:24<br>Gutting 36:20<br><hr/> H<br>handle 16:4 18:5<br>hand-in-hand<br>22:9<br>happen 11:9 13:2<br>happened 12:21<br>happening 10:7<br>happens 18:20<br>hard 7:22 21:24<br>having 21:17<br>headed 21:13<br>health 29:4<br>hear 6:25<br>hearing 45:5<br>help 4:18<br>helpful 26:18<br>helping 23:21<br>29:18 |
|---|---|---|---|---|---|

|                   |                    |                   |                    |                   |                   |
|-------------------|--------------------|-------------------|--------------------|-------------------|-------------------|
| helps 22:4        | 39:12 42:19        | <b>J</b>          | 43:24              | likely 8:15 25:19 | manage 21:18      |
| hence 16:24       | increase 10:2      | Jackie 3:11 33:5  | landfills 14:2     | limit 27:17       | management        |
| hidden 20:3       | increased 39:13    | 33:11 37:18       | large 9:2 15:1,2,6 | line 12:12,13     | 15:8 30:6 39:17   |
| high 1:8 8:2,7,12 | 41:7               | 43:19             | 16:3 17:13         | 30:24             | 42:12 43:4        |
| 26:13             | increasing 13:4,6  | job 27:5          | 18:24 19:3,8,18    | link 27:1         | Manager 30:1      |
| highlights 27:5   | 37:5,8             | Johnson 6:5       | 20:3 22:17         | list 27:21        | 38:17             |
| himself 5:16      | INDEX 3:1          | join 26:25        | 23:16 31:9         | little 8:9 16:1   | many 8:20,21      |
| history 32:8      | Indian 23:13       | June 5:9 7:5      | larger 22:16,23    | 38:15             | 9:22 18:14 19:7   |
| hoopla 17:13      | indicate 28:1      | 16:14 44:16,20    | largest 9:25 19:2  | Lloyd 2:3 5:12    | 22:10 31:14       |
| 18:11             | individual 38:12   | just 6:13 7:18    | 33:21 35:2         | load 31:16        | 33:22 34:16       |
| hope 33:23        | individuals 27:21  | 10:17 19:4 21:6   | large-scale 23:4   | local 31:5        | 36:13             |
| hopefully 44:24   | 44:10              | 21:23 22:11,12    | 25:19              | location 9:9      | maps 24:3         |
| hugh 25:15 31:10  | Industrial 12:22   | 25:21 26:12,15    | last 12:11,15,21   | 37:25             | market-based      |
| human-induced     | information 4:24   | 26:19 30:3 31:4   | 12:24 13:1         | locations 4:15    | 39:18             |
| 13:11             | 6:14 26:12,17      | 31:8 32:2,18      | 16:12 20:15        | locked 10:14      | Maryland 2:14     |
| hundred-thous...  | 26:18,22           | 34:17 36:14       | 25:4,21 33:19      | logistics 5:22    | material 10:14    |
| 12:11,16 13:1     | infrastructure     | 37:16 44:20       | 34:1 35:1 40:14    | long 27:3         | materials 10:9    |
| hydro 39:1        | 23:2,22 25:1       |                   | lastly 10:17       | look 11:8 18:15   | 35:16 36:15       |
| hydrogen 26:2     | 31:8,9,23 35:17    | <b>K</b>          | later 16:1         | 22:7 24:16        | matter 36:3 46:4  |
|                   | initially 27:17    | keep 8:7 10:20    | lay 35:5           | looked 15:5       | matters 37:13     |
| <b>I</b>          | initiated 41:14    | 30:24,25 38:5     | lead 22:2          | 22:13             | may 1:6 32:17     |
| idea 10:6         | initiative 4:19,20 | keeping 33:8      | Leadership 34:14   | looking 10:1,3,18 | 33:1 38:2,3       |
| ideas 29:18       | 16:14,15,21,23     | 38:18             | leads 31:12        | 13:4 21:6,13      | 41:18 45:5 46:4   |
| identify 6:10     | 16:24 17:1,11      | kept 26:13        | leak 20:7          | 25:12,24 26:3,8   | maybe 7:13        |
| identifying 4:8   | 25:22,22           | Kevin 6:5         | leakage 20:8       | Lorenzi 2:3 4:2   | mean 8:23 12:3,7  |
| Impact 1:4 4:7    | initiatives 8:14   | key 8:14 9:16     | learned 36:22      | 5:12,20 6:7       | 12:8 24:23        |
| 5:5,10,21 6:17    | 16:11 22:24        | 11:5,5,18 13:18   | least 11:16 15:4   | 27:9,15 29:22     | meaningful 39:11  |
| 7:7,8 8:17        | inject 36:10       | 16:11,18 19:19    | 18:8 19:10         | 30:16 32:15       | 39:24             |
| 21:12 28:25       | input 5:6,6        | 25:22             | 27:17              | 37:14 38:3,8,12   | means 10:23       |
| 32:23 37:21       | instrumentation    | kind 12:19 19:20  | leave 22:8 38:20   | 41:20,25 42:3,7   | 13:11 35:19       |
| 41:2 44:12        | 24:15              | 22:11 26:15,17    | led 5:24           | 44:9              | measurement       |
| impacts 4:9 41:7  | intended 20:19     | 31:25 38:19       | left 10:24 11:10   | loss 43:2         | 22:20             |
| implementation    | intensity 4:22     | kinds 25:18       | 21:9 22:16         | lost 42:24        | mechanisms 10:1   |
| 5:2 37:20         | 15:11 17:6         | Klara 3:7 5:17,17 | legacy 19:24       | lot 11:19 17:8    | 10:10             |
| implications 8:11 | Intent 41:3        | 7:16,21,24        | legs 15:9,10       | 21:5 24:14        | meet 19:20        |
| 12:25 13:23       | interest 23:17     | 27:12             | length 27:19       | 43:17             | meeting 1:5 4:2,3 |
| 21:17             | 26:7 37:9          | Klaus 3:10 30:17  | less 23:17 38:7    | lower 11:10       | 5:23 6:8,14,15    |
| importance 9:1    | interested 26:18   | 30:20 32:15       | lessons 36:23      | 12:12 15:14       | 6:22,24 26:13     |
| 16:15             | 36:9               | know 9:6 11:14    | let 12:6 22:12     | 21:1,8 22:6       | 40:3,25 44:22     |
| important 5:9     | Interestingly      | 18:1 21:4 22:13   | 26:15 31:3         | 39:14             | 45:1              |
| 20:9 30:7 31:16   | 37:8               | 26:15             | let's 4:2 11:8     | L-A-I 42:8,11     | meetings 4:14 5:7 |
| 39:4,24 42:20     | international      | knowing 43:24     | 18:18 25:2         | L-A-M-B-E-C-K     | megawatts 38:24   |
| 42:21 44:1        | 34:13              | known 32:20       | level 8:2,7,12     | 30:20             | Member 30:22      |
| importantly 17:3  | introduce 5:16     | 35:10             | 12:20,20 18:17     |                   | members 29:11     |
| improve 20:1      | 6:2                | Kurt 3:8 28:4,7   | 26:13              | <b>M</b>          | mention 25:21     |
| improved 15:15    | investment 5:1     | K-U-R-T 28:7      | levels 11:17,24    | made 7:11 32:20   | 37:17 42:18       |
| improving 15:17   | IRS 38:5           |                   | 18:19 29:3         | 32:21             | mentioned 10:17   |
| 15:17,19          | issue 16:3,3,17,19 | <b>L</b>          | 40:23              | magnesium 10:12   | 15:23 16:11,18    |
| INC 2:11          | 29:10 34:12        | L 46:7            | leverage 10:1      | magnitude 19:4    | 27:1 37:18,19     |
| incentives 32:6   | 40:2,9             | lab 34:2          | life 10:21         | mainly 13:23      | 42:17 44:3        |
| 35:23 40:10       | issues 4:8 24:10   | laboratory 2:5    | light 18:1         | major 40:21       | message 15:25     |
| include 28:20     | 24:23 25:2 29:2    | 5:13,19 8:1       | like 8:21 15:12,18 | make 10:7 13:21   | 18:6 19:6,17      |
| 40:4 41:6         | 32:19 35:5         | Lal 3:13 42:8,10  | 25:21 26:11,12     | 17:18 19:3        | messages 12:14    |
| includes 6:15     | 36:25 37:15,24     | 42:10             | 28:18 30:3         | 20:13,15 27:10    | 18:23             |
| 41:11             | 39:4,20            | Lambeck 3:10      | 37:10 38:5         | 27:22 28:13       | methane 13:15     |
| including 7:5     | item 41:5          | 30:17,19,20       | 40:15 42:18        | 44:11             | 13:18,25 14:1,1   |
| 26:5,16 29:9      |                    | land 39:16 43:22  | 44:10              | making 28:1,7     | 19:14 22:3,20     |

|  |   |   |   |  |  |
|--|---|---|---|--|--|
| 25:9<br>methods 4:12 9:3<br>9:4 25:1<br>metric 18:21,24<br>43:8,11<br>metrics 17:4<br>Mexico 25:11<br>microphone 7:18<br>7:18<br>mid 37:6<br>middle 14:9<br>15:15 18:15<br>Midwest 23:10<br>28:11 34:25<br>mid-2006 7:14<br>might 10:2 13:2<br>25:5 37:16<br>Mike 3:9 29:23<br>29:25<br>Mill 2:6<br>million 18:21,23<br>34:3,7 43:8,11<br>43:14,16<br>millions 20:11<br>mine 42:19<br>mineral 10:11<br>minerals 10:11<br>mines 14:3<br>minutes 7:24<br>10:17 27:10,18<br>mitigate 20:8<br>mix 10:25 11:11<br>11:14 13:14<br>14:10 17:9<br>money 33:20<br>39:7<br>monitoring 22:20<br>24:13 38:4<br>43:19<br>month 24:20,22<br>monthly 26:25<br>27:4<br>months 23:6<br>24:22<br>more 11:19 12:4<br>16:1 17:3 18:3<br>18:8 19:11 21:2<br>22:9 23:2 24:17<br>27:20 30:11<br>41:18<br>more's 18:9<br>most 13:19 24:5<br>34:19 35:2 36:8<br>mouth 33:20<br>move 29:12<br>moving 28:22<br>29:5 | much 12:4 16:25<br>17:12 18:11<br>23:17 29:22<br>42:3 44:9,25<br>Mudd 3:9 29:23<br>29:25,25<br>M-U-D-D 29:25<br><br>N<br>name 5:12 6:3<br>27:24,25 29:25<br>30:19 33:11<br>38:16 42:10<br>NASA 21:21<br>nation 33:22<br>39:25<br>national 2:5 5:18<br>7:25 14:11<br>16:13<br>nations 23:13<br>35:19<br>natural 9:25 14:2<br>15:24 37:9 39:1<br>near 21:13<br>nearly 11:15 34:3<br>necessary 16:2<br>28:17 29:14<br>36:17,23 39:20<br>44:6<br>need 7:18 15:6<br>16:5 25:3 27:20<br>32:5 36:12 37:1<br>needed 4:24<br>40:22<br>needs 11:4 31:23<br>NEPA 2:3<br>NETL 42:14<br>network 28:10<br>never 32:9<br>New 25:11<br>newsletter 26:24<br>next 7:10,12 13:7<br>16:5,8 17:7,11<br>17:14 18:12<br>19:20 21:18<br>22:14 23:19<br>25:20 26:21<br>31:12 38:12<br>nice 14:25 24:3<br>NOAA 21:21<br>nobody 24:11<br>non-CO2 19:13<br>22:3,19<br>NORTH 1:8<br>northeast 23:14<br>23:15<br>note 34:4,8,24 | notes 36:10 46:5<br>Notice 41:3<br>No-till 22:8<br>nuclear 15:13<br>38:25<br>number 17:23<br>18:24 37:5 40:2<br>40:14<br>numbers 17:21<br><br>O<br>obtain 4:4<br>obvious 19:22<br>occur 10:7 27:5<br>occurring 10:6<br>occurs 21:2<br>OCDO 34:8,22<br>35:7 36:16<br>ocean 9:20,21,24<br>10:3,3,5<br>oceanic 36:7<br>oceans 9:19<br>odd 8:20<br>offer 19:24 26:23<br>35:22<br>offered 27:20,22<br>Office 1:2 8:4<br>20:25 21:5,9<br>33:12<br>OFFICER 2:3<br>often 15:9 24:18<br>33:16<br>Ohio 1:9 28:8,9<br>28:10,18 30:8<br>30:23 31:24<br>32:8 33:12,13<br>33:16,18,25<br>34:1,3 35:11,13<br>35:14 36:1,11<br>42:12,20 43:6<br>Ohio's 36:8<br>oil 9:13 11:13<br>14:10 25:7<br>Okay 38:12<br>41:25<br>once 24:20,20,20<br>24:22,22 25:1<br>one 5:14 9:21<br>10:14 12:15<br>16:3,13,15,18<br>17:12,19 18:10<br>19:3 20:15 23:1<br>33:21 34:25<br>36:14,21 37:17<br>38:2,6 40:3<br>41:4,11,22 43:5<br>43:12 44:2,19 | ones 21:15<br>only 43:16 44:5<br>opening 27:19<br>operates 38:22<br>opportunities 9:9<br>opportunity 7:19<br>14:25 27:23<br>28:24 41:19<br>43:17 44:14,18<br>option 9:22 10:8<br>10:15 15:21<br>16:3 19:19<br>options 4:21 9:17<br>9:18 10:2 11:1<br>15:5,8,12 16:2<br>16:6,19 17:18<br>18:5 19:12,18<br>40:20<br>oral 6:25 28:13<br>44:15<br>order 27:15<br>organization<br>28:2 29:1<br>organizational<br>28:1<br>organizations<br>18:14 23:12<br>28:10<br>other 5:14 7:5<br>8:24 9:3,18<br>10:25 12:17<br>14:18 19:7<br>30:12 31:14<br>35:9 38:16<br>39:16 40:24<br>44:10<br>others 27:13,22<br>otherwise 8:25<br>out 7:19 9:5,24<br>21:16 24:22<br>25:2,3,7 26:24<br>30:5 33:18<br>41:23 42:1<br>outline 8:6<br>outreach 24:10<br>outside 6:13<br>27:16 44:24<br>over 8:13,14<br>12:10,21,24<br>16:11 17:6<br>33:19 34:1,17<br>38:23 40:14<br>overall 37:11<br>overview 8:12<br>own 34:20<br>owns 38:22 | P<br>package 27:2<br>packets 26:22<br>page 3:5 27:2<br>part 4:4 5:9 6:5<br>13:24 18:2<br>33:16,19 39:2<br>44:1<br>participate 29:17<br>34:18<br>participating<br>28:14<br>participation 4:5<br>44:25<br>particular 33:2<br>37:21<br>particularly 6:9<br>partner 28:11<br>partnered 34:5<br>partners 23:1,8<br>23:10<br>partnership 23:9<br>23:10 28:11,15<br>34:25 35:2<br>42:21<br>partnerships<br>23:7,20 33:23<br>34:23 35:1<br>41:13 42:17<br>parts 24:6<br>passed 39:7<br>pathway 10:15<br>37:20<br>Paul 36:19<br>pay 36:19<br>PEIS 41:6<br>Pennsylvania 2:7<br>5:14<br>people 8:21 15:9<br>26:16 27:9<br>29:16 37:15<br>38:16 44:6<br>per 11:25 12:2<br>13:5 43:12<br>percent 10:13<br>11:3,12,13,17<br>11:18 12:24<br>13:14,16 14:10<br>14:11,16,17,17<br>14:21,22,23<br>19:11 38:24<br>performed 18:13<br>performs 20:22<br>perhaps 44:7<br>period 5:8 29:8<br>29:21<br>permanence | 22:22<br>permanently<br>26:8<br>person 28:3<br>30:16 33:5<br>38:20 42:1,7<br>perspective 22:14<br>31:4,5<br>Peter 36:19<br>picture 11:7<br>24:19<br>pie 10:24,24<br>11:10 13:8,24<br>14:9,13<br>pieces 36:17<br>pipeline 14:2<br>Pittsburgh 2:7<br>5:14<br>placed 41:24<br>planned 4:14 7:9<br>plans 6:19 37:23<br>plant 9:2 10:21<br>15:20 18:25<br>19:4 24:21 35:6<br>35:13,24 36:19<br>planting 9:4 20:1<br>39:16<br>plants 19:1 33:17<br>35:21 38:23<br>play 24:11 31:10<br>please 27:13 38:5<br>pleased 34:4<br>point 9:1 13:3,21<br>14:8 26:9 28:23<br>31:12 36:8<br>pointed 33:16,18<br>points 31:3<br>policies 40:1<br>policy 41:11<br>pollutants 16:24<br>pollution 26:5<br>portfolio 4:21<br>18:11 36:6 39:2<br>portfolios 20:5<br>portion 27:8<br>33:15<br>portions 32:21<br>possible 20:1<br>potential 4:9,22<br>39:22 41:7 43:3<br>43:7,9,13,15<br>potentially 12:7<br>Potomac-Huds...<br>2:11 5:24 6:1,4<br>power 9:2 14:24<br>14:24 15:3,20<br>18:25 19:1,3 |
|--|---|---|---|--|--|

|   |  |   |  |   |  |
|---|--|---|--|---|--|
| 30:2,23 35:20<br>38:22<br>ppm 13:5<br>practice 44:4<br>practices 10:20<br>43:25<br>predominant<br>11:22<br>preparation 5:4<br>5:21<br>prepare 5:10 6:8<br>6:17 7:1<br>preparing 4:5 7:6<br>present 43:16<br>presentation<br>26:11 27:8<br>presently 36:14<br>President 4:20<br>presidential 16:9<br>16:16 17:1<br>press 16:25<br>price 37:9<br>prioritizing 4:8<br>probably 7:13<br>9:10 16:24<br>19:22 23:5<br>problem 33:17<br>proceed 34:10<br>proceedings 1:13<br>46:3<br>process 4:4 6:16<br>7:23 29:16<br>35:20<br>produce 11:22<br>15:20 25:13,17<br>26:1<br>Professor 42:11<br>program 1:3 4:10<br>5:3 7:2,2 8:12<br>8:13 13:22,24<br>14:20 15:4,22<br>16:10 17:8<br>20:21 21:8 22:4<br>22:16,17 24:14<br>24:17 26:20<br>30:6 34:10,16<br>35:10,14 36:5<br>36:13,14,20<br>38:6 39:18<br>41:15 42:14<br>44:11<br>Programmatic<br>1:4 8:17 21:11<br>32:23 41:1<br>programs 33:21<br>35:21 37:11<br>43:5 | project 24:11<br>26:10 33:23<br>35:8,23 37:17<br>37:19<br>projections 11:15<br>projects 32:11<br>34:2<br>prominent 13:13<br>prop 10:12<br>proposed 35:6<br>protected 29:5<br>Protection 22:2<br>protocols 24:14<br>24:24<br>prototype 35:12<br>proud 33:25<br>34:24<br>proven 24:7<br>provide 7:16,19<br>31:6 40:3,9<br>44:15,16<br>provided 6:14,20<br>6:23 7:19 38:21<br>41:17<br>providing 41:18<br>41:20<br>provinces 23:13<br>public 1:5 4:5<br>6:10 29:4,9,12<br>29:15 30:20<br>32:21 45:5<br>public-private<br>41:13<br>publish 33:3<br>purpose 4:16<br>pursue 15:6<br>pursued 9:17<br>20:17 34:14<br>pursuing 10:15<br>14:20 17:9<br>18:12<br>put 18:16 24:10<br>25:7,8 33:20<br>puts 17:3<br>putting 20:11,14<br>pyramid 15:11<br>P.E 2:10<br>P.E.I.S 32:22<br>p.m 45:4<br>P.S 38:2<br>P.U.C.O 32:9 | quantity 17:15<br>question 41:22<br>questions 9:23<br>31:2 43:18<br>quite 33:10 34:12<br><hr/> R<br>raised 43:18<br>range 37:15<br>ranges 18:4<br>ranging 34:2<br>rate 10:4 13:6<br>32:11 43:23<br>Rattan 3:13 42:8<br>42:10<br>reaction 10:9<br>ready 40:19<br>real 9:22 23:16<br>realistic 40:5<br>reality 24:5 35:25<br>realized 43:16<br>really 9:6,16,25<br>15:4 16:10 21:3<br>21:12,15 23:15<br>32:18 37:19<br>reason 10:3<br>17:12 18:10<br>21:10 28:14<br>34:22<br>reasonable 40:4<br>41:10<br>reasons 24:1<br>receive 5:7 27:4<br>received 7:5<br>recent 31:24<br>recognize 32:25<br>40:11<br>recognized 40:16<br>recognizing 40:8<br>recommend 41:4<br>41:6<br>record 6:21 31:1<br>recovery 25:8,9<br>reduce 17:5 30:9<br>40:14,20<br>reduced 15:11<br>reducing 4:22<br>reduction 19:10<br>39:24 40:3,22<br>reductions 19:20<br>39:9,11<br>refer 8:21<br>reforestation<br>10:19<br>refrigerators<br>15:18<br>regarding 6:10 | 6:14 34:21<br>region 19:1 23:18<br>25:5,6 31:14<br>34:20 40:8<br>42:21<br>regional 23:1,6<br>31:7 34:23<br>regions 24:2,8<br>25:12,20 31:14<br>31:18<br>Register 41:2<br>registered 27:16<br>27:21 28:3<br>30:16 33:5 42:7<br>registration 6:20<br>40:11<br>regulated 32:10<br>regulations 24:12<br>regulatory 24:9<br>reiterates 36:12<br>relate 13:22<br>14:20 32:19<br>related 6:19<br>17:10 18:12<br>20:23 37:24<br>relating 29:2<br>relative 13:21<br>27:6<br>released 16:22<br>relevant 32:22<br>remain 11:16<br>remaining 22:24<br>remarks 27:19<br>Remember 36:24<br>37:4<br>remind 44:20<br>renewable 15:12<br>28:20 39:14<br>renewables 19:16<br>reporter 6:7<br>27:25 46:7<br>representative<br>5:15<br>representatives<br>5:25<br>represented 6:1<br>represents 14:25<br>request 32:10<br>requested 38:13<br>require 4:20<br>39:12<br>required 24:19<br>requirements<br>8:13 19:21<br>requires 35:15<br>requiring 5:4<br>research 4:11 | 14:19 20:17<br>21:2,3 28:16,22<br>29:13 36:17<br>reservoir 9:14,14<br>24:19 25:16<br>reservoirs 9:14<br>residence 44:24<br>resides 21:8<br>resolve 8:16<br>resource 31:15<br>resources 26:16<br>35:16<br>respect 19:25<br>30:14<br>rest 41:16<br>restoration 42:18<br>43:3<br>result 41:8<br>review 4:6 7:11<br>41:1,12<br>Revolution 12:22<br>re-emphasize<br>32:6<br>rich 32:8<br>right 9:21,25<br>11:1,20 12:18<br>13:4 14:20,22<br>18:4 21:1 23:12<br>23:13 24:10<br>right-hand 14:13<br>17:20,22<br>Road 2:6<br>rob 36:19<br>rock-like 10:11<br>role 31:11<br>room 6:14<br>roughly 11:18<br>26:24<br>RUGBY 2:12<br>rule 33:9<br>R&D 13:22 16:10<br>20:24 21:10,13<br>22:17 30:8 31:8<br>32:2,5,9,11<br>33:21 34:2,16<br>35:18,22 36:5<br>36:12,14,20 | scenario 18:16<br>Schad 46:7<br>schedules 40:5<br>Science 20:25<br>21:6 42:11<br>scientific 41:12<br>scope 6:11 33:1<br>SCOPING 1:5<br>Scott 3:7 5:17<br>7:15,20,24<br>37:18<br>second 4:14<br>16:20 28:23<br>second-to-none<br>35:17<br>section 15:15<br>sector 14:15,22<br>sectors 14:7<br>sediment 9:20<br>see 11:2,12,25<br>12:18,19 13:12<br>13:15 14:15<br>15:11 16:4<br>17:22,25 18:1,2<br>25:2<br>seems 13:6 33:9<br>seepage 20:4<br>seldom 33:18<br>36:2<br>selected 35:1<br>sense 10:22 12:6<br>sensible 31:22<br>sentence 19:15<br>separate 37:20<br>37:23<br>sequester 26:8<br>43:3<br>sequestered<br>20:10<br>sequestering<br>15:22<br>sequestration 1:3<br>4:12,17,25 5:2<br>6:19 7:2,17 8:3<br>8:9,12,19,20<br>9:17,22 10:16<br>10:18 16:18<br>17:3,12,19 18:9<br>18:10 19:9,12<br>19:19,21 20:13<br>22:8,18 23:7,17<br>23:18 24:11<br>25:5,19 26:20<br>26:24 27:7<br>28:15,21 29:2<br>29:13 31:8<br>34:10,14,22,25 |
|---|--|---|--|---|--|

|   |   |  |  |   |  |
|---|---|--|--|---|--|
| 35:8 36:4,5,7<br>37:25 39:16,17<br>39:23 41:9,14<br>42:12,14,16,22<br>43:7,10,15,21<br>44:5,11<br><b>sequestrational</b><br>43:23<br><b>served</b> 35:4<br><b>settlement</b> 42:25<br><b>seven</b> 23:8 35:1,3<br><b>several</b> 8:14 9:8<br>12:11,15 16:12<br>19:1 34:1,5<br>43:18<br><b>shade</b> 18:3<br><b>Shaw</b> 3:12 38:13<br>38:15,17 41:24<br>42:1,6<br><b>sheet</b> 6:20<br><b>sheets</b> 6:23<br><b>short</b> 30:25<br><b>shorter</b> 38:16<br><b>show</b> 10:23 11:7<br>16:1 17:14 19:4<br>19:7,8 20:19<br>21:23 24:4 26:4<br><b>showing</b> 14:6<br>27:5<br><b>shown</b> 26:21<br><b>shows</b> 10:25 11:2<br>11:10,11 12:10<br>12:11 13:8 14:9<br>14:14 17:20<br>18:3,13 21:19<br>22:16 23:11<br>26:19<br><b>side</b> 9:23 12:19<br>14:13 15:16,19<br>17:21,22,22<br><b>sign</b> 6:21<br><b>signed</b> 27:10<br><b>significant</b> 17:15<br>34:24 39:2,6,8<br>40:13<br><b>silver</b> 36:3<br><b>similar</b> 34:6<br><b>simple</b> 38:5 43:20<br>43:22<br><b>simply</b> 43:24<br><b>since</b> 12:22 34:12<br>39:7 42:25<br><b>sink</b> 9:25<br><b>sinks</b> 15:24 23:16<br>24:2,6<br><b>site</b> 37:25<br><b>siting</b> 30:21,23 | 31:4 35:12,20<br>36:1<br><b>situation</b> 8:10<br><b>situations</b> 25:11<br><b>six</b> 24:22 27:9,13<br>44:6<br><b>Skies</b> 16:23<br><b>slide</b> 13:3 14:19<br>17:14 18:6,23<br>19:6 20:19<br>21:19 22:14,15<br>23:11<br><b>slides</b> 16:5 17:15<br>22:25<br><b>slightly</b> 13:6<br><b>small</b> 13:24 37:5<br><b>smaller</b> 37:4<br><b>small-size</b> 37:6<br><b>snapshot</b> 22:11<br>24:16<br><b>socioeconomic</b><br>41:7<br><b>soil</b> 10:20 42:11<br><b>soils</b> 42:19,19,24<br>43:4,10<br><b>solar</b> 15:13<br><b>solid</b> 10:9,14<br><b>solution</b> 31:22<br>33:19<br><b>solutions</b> 4:10<br>28:19<br><b>solving</b> 39:3<br><b>some</b> 8:8 9:18<br>10:5 12:14 14:4<br>15:9,14 17:3<br>18:13,17,23<br>19:1 22:1,5<br>23:10 24:1,6,23<br>24:25 25:1,6,10<br>25:12 26:11<br>31:16,19,23<br>32:17 33:1,14<br>35:5 37:1 38:16<br>43:4<br><b>something</b> 11:21<br>16:7,13,22 17:5<br>20:20<br><b>somewhere</b> 42:24<br>43:13<br><b>soon</b> 23:3 36:25<br><b>sort</b> 31:25<br><b>sound</b> 40:19<br><b>source</b> 9:2 11:6<br>15:1<br><b>sources</b> 13:10,11<br>24:2 26:12<br>39:14 | <b>speak</b> 14:14<br>15:21 22:24<br>30:5,12,17 33:6<br>38:13 44:19<br><b>speaker</b> 44:2<br><b>specialists</b> 5:24<br><b>specifically</b> 8:4<br>31:20 32:19<br><b>specified</b> 17:10<br><b>spell</b> 27:24<br><b>spent</b> 39:6<br><b>stabilization</b><br>28:17<br><b>stabilize</b> 18:17,18<br><b>stabilizing</b> 40:23<br><b>stable</b> 11:18<br><b>staff</b> 30:22 38:20<br>42:1<br><b>stage</b> 7:12<br><b>stakeholders</b><br>40:24<br><b>standpoint</b> 9:8<br>16:9<br><b>start</b> 12:22<br><b>state</b> 26:12 27:24<br>28:18 30:8 32:8<br>33:21 35:20,21<br>42:12<br><b>Statement</b> 1:4 4:7<br>5:5,10,22 6:17<br>7:7,9 8:17<br>21:12 28:25<br>32:23 37:21<br>41:2 44:13<br><b>statements</b> 16:16<br><b>states</b> 1:1 2:4<br>10:23 11:1,4<br>13:8,13,19<br>14:23 17:4,16<br>18:15,19 22:6<br>23:8,14 25:10<br>27:6 42:23 43:9<br>43:15<br><b>statewide</b> 28:9<br><b>state-of-the-art</b><br>26:1<br><b>stating</b> 9:21<br>11:16<br><b>stays</b> 20:15<br><b>stenographic</b><br>46:5<br><b>steps</b> 40:14<br><b>still</b> 9:22 36:25<br><b>stimulating</b> 29:9<br><b>stool</b> 15:10<br><b>storage</b> 8:22,24<br>9:8,11,11 15:23 | 18:5 26:9<br><b>store</b> 9:9 35:9<br><b>stored</b> 10:20<br><b>straight</b> 12:20<br><b>strategy</b> 39:24<br>42:21<br><b>STREET</b> 1:8<br><b>stressing</b> 32:2<br><b>strong</b> 35:18<br><b>strongly</b> 36:12<br>42:13<br><b>structure</b> 8:13<br><b>studies</b> 6:19<br><b>subjective</b> 24:18<br><b>submit</b> 6:24<br>33:14<br><b>submittal</b> 41:17<br><b>submitted</b> 31:1<br><b>submitting</b> 28:12<br>29:20<br><b>subscription</b><br>26:23<br><b>substances</b> 10:11<br><b>succeed</b> 36:22<br><b>success</b> 34:15<br>36:18<br><b>successful</b> 38:7<br><b>sudden</b> 20:3<br><b>sufficient</b> 28:16<br>29:12<br><b>suggestions</b> 30:25<br><b>suitable</b> 24:6<br><b>Suite</b> 2:13<br><b>summarize</b> 30:3<br><b>summary</b> 7:17<br><b>summer</b> 7:10,12<br><b>Super</b> 36:15<br><b>supply</b> 15:19<br>38:18<br><b>support</b> 22:4<br>28:15 29:15<br>31:6 35:24,25<br>36:4 39:9,21<br>43:20<br><b>supported</b> 4:17<br>33:20<br><b>supporting</b> 32:9<br>35:12<br><b>supportive</b> 28:22<br><b>supports</b> 34:9,22<br>35:7 36:11<br><b>sure</b> 20:13,15<br><b>surprise</b> 23:15<br><b>survey</b> 21:21<br><b>switching</b> 15:13<br>15:14<br><b>synergistic</b> 25:18 | <b>system</b> 35:18<br><b>systems</b> 14:3<br><b>S-H-A-W</b> 38:17<br><br><b>T</b><br><b>table</b> 29:18 38:21<br><b>take</b> 11:8 12:14<br>15:25 18:6<br>24:15,19,20<br>27:15 32:3,4<br>44:17<br><b>taken</b> 1:6 40:12<br>40:13 46:4<br><b>talk</b> 8:6,9,19<br><b>talked</b> 16:17<br>43:19<br><b>talking</b> 43:6<br><b>target</b> 17:10<br><b>targeted</b> 7:10<br><b>task</b> 22:1<br><b>tax</b> 35:23 38:6<br><b>team</b> 5:23 6:1,5<br><b>techniques</b> 36:6<br><b>technological</b><br>37:24 40:10,21<br><b>technologies</b> 4:12<br>5:1 14:4 17:9<br>20:6 22:22<br>23:23 24:25<br>26:4 30:1 36:6<br>38:18 39:13<br>40:6<br><b>technology</b> 2:5<br>4:21 5:19 8:1<br>16:14,19 17:9<br>20:21 21:16<br>26:1 29:6 31:13<br>31:19,22 32:1<br>40:19<br><b>temperature</b><br>12:12,16,25<br><b>term</b> 8:20 21:13<br>22:21<br><b>terms</b> 4:6 12:3<br>14:15<br><b>terrestrial</b> 9:4<br>10:18 22:7 36:7<br>39:15 42:16,23<br>43:7,10,21 44:4<br><b>test</b> 23:4 24:22<br>25:2,24,25 26:3<br><b>testimony</b> 33:9<br><b>testing</b> 4:11<br><b>thank</b> 5:11,17<br>28:6 29:22<br>30:15,19 32:14<br>37:12,14,25 | 38:8 41:19,20<br>42:3,6 44:8,9<br>44:25 45:2<br><b>Thanks</b> 32:15<br><b>their</b> 27:18 29:18<br>31:15<br><b>themselves</b> 6:2<br><b>thing</b> 19:8 25:4<br>32:13 37:17<br><b>things</b> 15:12,18<br>35:3 41:3<br><b>think</b> 11:8 25:5<br>39:3,19,23<br>43:19,21<br><b>third</b> 15:21 29:7<br>30:16<br><b>thorough</b> 41:11<br><b>though</b> 39:2<br><b>three</b> 15:9,10,10<br>16:1 22:17<br>23:13 28:13<br>31:3<br><b>three-prong</b> 32:7<br><b>through</b> 5:8<br>18:15 21:11<br>26:25 27:1,21<br>35:25 36:23<br>39:16 41:13<br>42:16 43:3<br><b>throughout</b> 15:4<br>20:17,18,23<br>21:20,25 23:7<br>27:6 34:17<br><b>tick</b> 37:8<br><b>tie</b> 43:23<br><b>time</b> 12:10 27:20<br>30:11,15 32:12<br>37:12<br><b>times</b> 34:16<br><b>today</b> 8:2 10:12<br>23:23<br><b>together</b> 18:16<br><b>tomorrow</b> 23:25<br>24:2<br><b>tonight</b> 5:11,15<br>6:1,22,23,25<br>27:10 30:15<br>44:11,16,18<br><b>tonight's</b> 6:15<br><b>tons</b> 17:24 18:21<br>18:24 20:12<br>42:25 43:2,8,11<br>43:12,14,16<br><b>tools</b> 24:15<br><b>top</b> 19:12<br><b>total</b> 11:14<br><b>toward</b> 21:13 |
|---|---|--|--|---|--|

|                  |                   |                    |                   |                   |                |
|------------------|-------------------|--------------------|-------------------|-------------------|----------------|
| towards 34:3     | 18:15,19 22:6     | view 36:8          | wide-scale 23:22  | 12 36:23          | 6              |
| track 13:1 20:6  | 23:7 27:6 42:23   | views 6:10         | wind 15:13        | 126 12:1          | 6.5 17:23,24   |
| tracking 12:17   | 43:9,15           | virtually 26:5     | wish 44:23        | 13,000 38:23      | 60 19:10       |
| tracks 22:22     | units 37:4,7      | vital 40:24        | wishes 34:8       | 150 12:21,24      | 626 2:6        |
| training 39:18   | university 35:18  |                    | WITNESSES 3:1     | 15236-0940 2:7    |                |
| transcribed 46:5 | unmineable 9:15   | W                  | 3:5               | 154 23:12         | 7              |
| transcript 1:13  | unproven 24:5,8   | Waltzer 3:8 28:4   | word 32:2         | 18 1:6 45:5 46:4  | 7 3:7          |
| 6:8 46:3         | until 34:16 44:16 | 28:6,7             | work 7:23 21:6    |                   |                |
| translates 13:19 | upgrade 37:6      | want 6:21,25       | 22:5,9 25:3       | 2                 | 8              |
| Transmission     | upper 12:13,18    | 10:5 11:7 12:14    | 35:17 40:18       | 20 38:22 43:16    | 8:00 45:1,4    |
| 31:9             | 18:2 20:21        | 13:21 14:8,13      | 42:15             | 200 43:1          | 80 43:2        |
| transportation   | urges 34:10       | 17:5 18:16         | worked 9:24       | 2001 16:14        | 81 13:14       |
| 14:17 35:16      | URS 6:5           | 21:23 24:10        | world 10:23 11:2  | 2002 4:20 11:8,11 | 86 11:3,11,17  |
| travel 44:23     | USDOE 33:23       | 26:15 27:22        | 11:5 13:20 15:4   | 11:14,17,24       | 87 11:18       |
| treatment 32:11  | 34:4 35:1 36:2    | 29:3,7 30:5        | 17:17,23,24       | 16:21 18:19       |                |
| tree 24:21 39:16 | 36:16 39:21       | 37:6               | 27:6 34:17,18     | 2004 1:6 45:5     | 9              |
| trees 9:4 20:2   | USDOE's 34:9      | wanted 28:13       | 43:11 44:7        | 46:4              | 9 13:15        |
| tremendous       | 36:12             | wanting 21:11      | world's 9:24      | 2012 4:24         | 90 14:23       |
| 39:20            | use 6:9,23 7:4    | watch 45:1         | 35:20             | 2015 18:21,22     | 90-second 33:9 |
| true 34:15 46:3  | 11:12,19 21:4,5   | water 25:12,13     | worth 18:8,9      | 2025 11:15,18     | 907-9078 2:15  |
| truly 16:5 30:8  | 22:21 25:25       | 25:14,17 35:16     | written 6:24      | 12:1              | 98 11:25       |
| truncate 33:10   | 26:4 31:20 38:6   | waterways 35:15    | 28:12 29:20       | 20814-3035 2:14   |                |
| try 12:6 18:18   | 43:22,24          | way 33:22          | 30:4,14 31:1      | 23 11:13          |                |
| 21:24 27:17      | used 14:24 25:16  | weblinks 26:21     | 33:14 38:9        | 24 11:13          |                |
| 39:9             | utilities 30:21   | website 26:19      | 41:17,22          | 25 10:13 43:13    |                |
| trying 9:25      | 32:10             | 27:1               | www.netl.doe.g... | 25th 5:9 7:6      |                |
| Tuesday 1:6 45:4 | U.S 4:3,23 5:18   | websites 26:17     | 26:21             | 44:17,20          |                |
| 46:4             | 7:25 34:17        | week 24:20         | W-A-L-T-Z-E-R     | 27 34:1           |                |
| turned 32:9      |                   | welcome 7:21       | 28:7              | 28 3:8            |                |
| turns 25:6       | V                 | 27:14              |                   | 280 12:20         |                |
| tweak 25:3       | Valentine's 16:21 | well 4:23 5:6,8,22 | Y                 | 29 3:9            |                |
| two 9:7 10:24    | Validating 24:25  | 7:2,4 10:4,19      | year 4:24 11:15   | 3                 |                |
| 13:17 16:11      | valuable 7:23     | 11:5 12:6 13:1     | 11:25 12:2 13:5   | 30 3:10 12:23     |                |
| 17:15 19:12      | vanguard 33:25    | 14:14 18:1 23:5    | 13:6,6 18:21,22   | 14:11,17,21       |                |
| 21:23 22:23      | various 4:15      | 25:5,6,14 37:11    | 23:5 35:1 43:8    | 300 43:10,14      |                |
| 23:12 33:19      | 13:10 25:20       | 37:16              | 43:11,12          | 301 2:15          |                |
| type 29:16 41:13 | venue 34:13,18    | were 18:14 23:24   | years 8:15 10:4   | 32 14:17          |                |
| types 28:21      | verifiable 20:9   | 31:2,23 42:4,17    | 12:11,16,21,24    | 33 3:11           |                |
| typically 9:3,13 | verification      | 43:18              | 13:2 16:12 17:7   | 370 12:21         |                |
|                  | 22:21 24:13       | we'll 27:15,20     | 34:1 40:14 43:1   | 38 3:12           |                |
| U                | 38:4 43:20        | 29:19 44:21        | 43:13 44:7        | 386-6159 2:8      |                |
| ultimate 28:19   | verify 20:10      | 45:1               | yell 7:18         | 39 11:13          |                |
| Ultra 36:15      | version 7:13      | we're 8:17 9:25    |                   |                   |                |
| under 9:12 16:16 | versus 24:7       | 10:15,18 11:19     | \$                | 4                 |                |
| underground      | very 7:23 8:2,7   | 11:24 12:1,4       | \$2.2 34:7        | 40 14:16,22 23:13 |                |
| 14:3             | 8:12 14:25 15:2   | 13:4 14:3,20       | \$3 34:3          | 400 1:8           |                |
| understand 8:21  | 17:18 19:19,22    | 15:21 16:7 17:9    |                   | 412 2:8           |                |
| 10:1 29:17       | 20:9 21:24,25     | 18:12 20:4,5,11    | I                 | 42 3:13           |                |
| 39:21            | 22:13 25:22       | 20:14 21:10,12     | 1 36:23           | 43215 1:9         |                |
| understanding    | 26:13 27:5        | 21:15 25:24        | 1,700 18:21,23    | 46 14:10          |                |
| 10:6             | 28:21 29:22       | 26:3,8 27:12       | 19:2              | 4833 2:12         |                |
| undertake 6:12   | 31:16,16 35:18    | 28:12,14,21,25     | 1.5 13:5          |                   |                |
| unique 25:10     | 39:4 42:3,4,13    | 29:5 39:3 43:6     | 10 17:7 40:14     | 5                 |                |
| United 1:1 2:4   | 42:20,21 44:9     | we've 6:22 18:13   | 43:8 44:7         | 5 42:24           |                |
| 10:23 11:1,4     | 44:25             | 18:17 39:6         | 100 2:13          | 50 43:13 44:7     |                |
| 13:8,13,18       | via 9:3           | while 36:11 38:25  | 11 40:14          | 55 38:24          |                |
| 14:23 17:4,16    | viable 20:16      | wide 37:15         | 11th 16:14        |                   |                |